

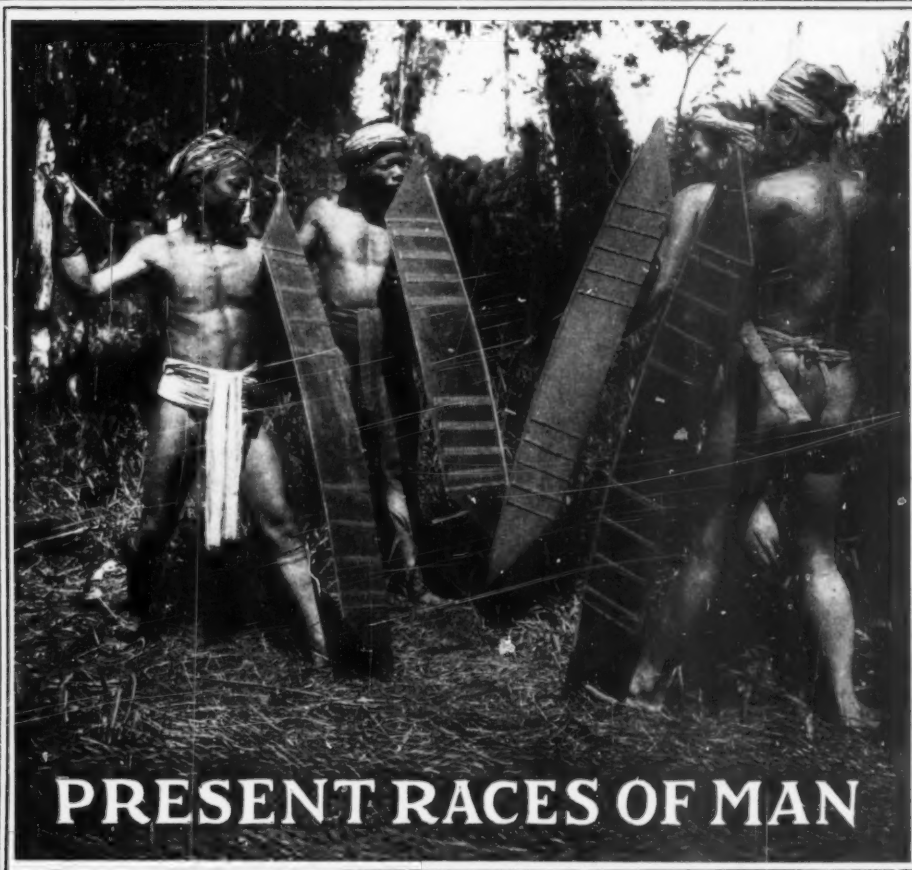
Vol. XXVI

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NATURAL HISTORY



PRESENT RACES OF MAN

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NATURAL HISTORY

THE JOURNAL OF THE AMERICAN MUSEUM

DEVOTED TO NATURAL HISTORY,
EXPLORATION, AND THE DEVELOP-
MENT OF PUBLIC EDUCATION
THROUGH THE MUSEUM



PRESENT RACES OF MAN

CLARK WISSLER, EDITOR

JANUARY—FEBRUARY

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VOLUME XXVI CONTENTS FOR JANUARY-FEBRUARY NUMBER 1

Cover: "Saptuans Showing Their War Prowess."

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Frontispiece, Alfred C. Haddon, the Dean of English Anthropologists

The Evolution of Human Races. HENRY FAIRFIELD OSBORN 3
A discussion of the varieties of living men, and the evolutionary results of man's past life

Peoples of Malaysia. FAY COOPER COLE 14
Observations on Malaysian races from data gathered by the author during three expeditions made for the Field Museum of Natural History

Span of Life and Average Duration of Life. RAYMOND PEARL 26
The author presents a clear statement of the distinction between the terms "span" and "duration" of life

Coast and Crest in Colombia. J. ALDEN MASON 31
An example of contrast in American Indian culture
With photographs taken by the author on an expedition for the Field Museum of Natural History

The Skin Colors of the Races of Mankind. CHAS. B. DAVENPORT 44
Description of several methods of recording skin color, especially by means of the color-mixer or color top

Californian Indian Types. E. W. GIFFORD 50
The author classifies the Indians of this region according to bodily form into three main types

Descendants of the Maya Indians. opposite 60
A series of photographs reproduced through the courtesy of the Carnegie Institution of Washington and E. L. Crandall

An Incident in Montagnais Winter Life. FRANK G. SPECK 61
An experience in an "open-top camp" in Labrador

Some Changes in the Human Face as Influenced by the Teeth. MILO HELLMAN 68
Showing how the shape of the face depends upon the teeth

The Hair. C. H. DANFORTH 75
The anthropological value of hair characters

The Relationship of Races as Shown by Blood Characteristics
REUBEN OTTENBERG 80
Observations on the agglutinative qualities of the blood, a phenomenon that follows Mendelian laws

The Ordeal of Getting Civilized. GILBERT L. WILSON 85
Troubles of an Indian treading the white man's path

The Ethnological Problems of Bering Sea. WALDEMAR JOCHELSON 90

Wood Carving in Ancient Peru. CHARLES W. MEAD 96

Rudolf Martin, 1864-1925

RECOLLECTIONS OF PROFESSOR MARTIN AS A TEACHER. . . . DINA JOCHELSON 98

A BIOGRAPHICAL SKETCH. CHARLES DAVENPORT 99

Alanson Skinner, 1886-1925. 101

Notes. 102

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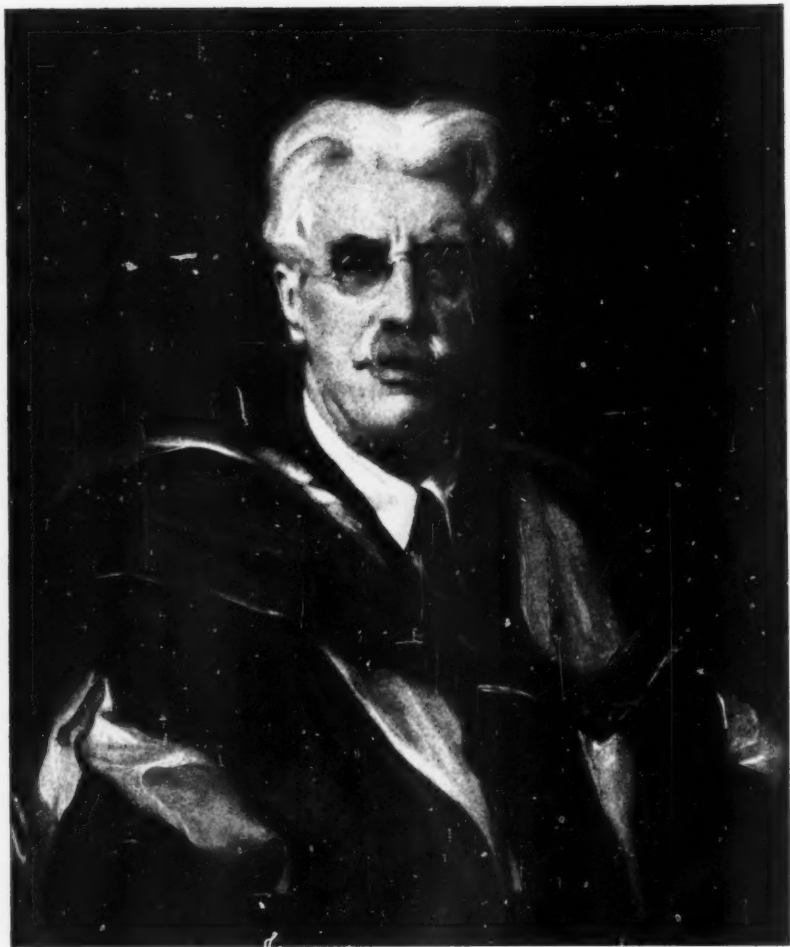
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Alfred C. Haddon

THE DEAN OF ENGLISH ANTHROPOLOGISTS

Alfred C. Haddon, University Reader in Ethnology, and Fellow of Christ College, Cambridge, England, a widely traveled, versatile scientist, recognized as a zoölogist and an authority on all phases of anthropology. Doctor Haddon, who has a long list of publications to his credit, is perhaps best known for his contribution to the Torres Strait Expedition, and for his book *The Races of Man*. A new and revised edition of the latter was issued last year.

NATURAL HISTORY

VOLUME XXVI

JANUARY-FEBRUARY, 1926

NUMBER 1

The Evolution of Human Races

By HENRY FAIRFIELD OSBORN

Honorary Curator of Vertebrate Paleontology

COMMENTS and observations on the probable causes of the origin of Races and Species in man, on the gradual divergence of races into subspecies, and on the grouping of species into primary human genera as distinct as the genera of the plant and animal world. Secular Natural Selection or Darwinism and secular Inheritance of Acquired Adaptations or Lamarckism, illustrated by theoretic origin of Arboreal, of Amphibious, and of Sartorial races of Man.

FRANCE, from the close of the eighteenth century, was the leader in Anthropology, the science of man. In 1875, Armand de Quatrefages, professor in the Museum of Natural History, Paris, delivered a course of elementary lectures on "The Natural History of Man"¹ to audiences of working people in Vincennes. These delightful lectures represent the pre-Darwinian point of view and dwell with emphasis upon the *unity* of human species and upon the intellectual, moral, and spiritual distinctness of man.

THE PRE-DARWINIAN PERIOD

In support of his opinion that all the greater and lesser divisions of the human race belong to a single species, namely, *Homo sapiens*, Quatrefages devotes Chapter I to the discussion of fertility. He observes: "*Fertility is the law of union between animals belonging to different races (mixed breeding),*" whereas "*infertility is the law when animals of different species unite (hybridization).*" This argument is now known to be invalid; we know that, both in nature and in experiment, many distinct species and even distinct genera of plants and animals occupying over-lapping geographic areas

interbreed freely and may leave a long series of hybrid descendants, some of which are highly useful both in plant culture and in animal culture.

If an unbiased zoölogist were to descend upon the earth from Mars and study the races of man with the same impartiality as the races of fishes, birds, and mammals, he would undoubtedly divide the existing races of man into several genera and into a very large number of species and subspecies. We recall the fact that in 1875 Quatrefages was profoundly influenced not only by the then prevailing ideas of the special creation of man as a distinct species but also by the classification of the great Swede, Linnæus (Carl Linné), father of systematic botany and zoölogy.

During the eighteenth century, in the course of developing his monumental "Systema Naturæ," Linnæus rendered an immortal service to science when he introduced the terms *Homo sapiens* to express the fact that man stands apart from other Primates as the substantive genus *Homo*, and that the first species of man we know is entitled to the adjective *sapiens*. He also defines the variety *Homo sapiens europæus* as white, sanguine, and muscular, with fair, wavy hair and blue eyes. We may take this as a starting

¹de Quatrefages de Breau, Jean Louis Armand: The Natural History of Man: A Course of Elementary Lectures. Translated from the French by Eliza A. Youmans. D. Appleton & Company, New York.

point for our review of the relation of terminology to our present knowledge and theory of human evolution.

THE POST-DARWINIAN PERIOD

Two centuries elapse, and we discover another genus supposedly related to man's ancestors, i.e.:

Pithecanthropus erectus

the ape-like man
(Greek-Latin: *Pithecus-anthropos*)

of erect stature
(Latin: *erectus*, straight)

We also discover that the European variety of man which Linnæus had in mind is not all Scandinavian, but that it includes three very distinct subtypes, races, or stocks, namely, the Scandinavian or Nordic, the Alpine or Ostro-Slavic, and the Mediterranean, each distinguished by racial characters so profound and ancient that if we encountered them among birds or mammals we should certainly call them *species* rather than *races*. Since, however, they coincide with racial distinctions, we adopt for three secondary races of man the subspecific terms:

Homo sapiens europæus nordicus—the tall, fair-haired, blue-eyed, narrow-headed, narrow-faced race.

Homo sapiens europæus alpinus—the medium-statured, dark-haired, gray- or brown-eyed, broad-headed, broad-faced race.

Homo sapiens europæus mediterraneus—the medium-statured, black-haired, black-eyed, narrow-headed, narrow-faced race.

Each of these races of men is distinguished by innumerable differences of character and predispositions, spiritual, intellectual, moral, and physical. For

example, the Nordic and Alpine races have a hairy covering over the greater part of the body. The men are heavily bearded, in adaptation to the severe climate of the cold northern regions from which the Nordics sprang, or to the cold mountain and plateau region from which the Alpine-Slavs sprang.

The members of the Mediterranean race, on the other hand, have relatively smooth and hairless bodies, in adaptation to the warm southern coast regions of Eurasia from which they sprang.

There has been another still more profound change both in our knowledge of facts and in our theories and conceptions since the time of Linnæus and even of Quatrefages, through anatomical researches among the Asiatics and Africans. This is the recognition that the genus *Homo* is subdivided into three absolutely distinct stocks, which

in zoölogy would be given the rank of species, if not of genera, stocks popularly known as the Caucasian, the Mongolian, and the Negroid:

Homo sapiens europæus—North and south Eurasiatic stock, wavy hair (cymotrichous) with intermediate cross section. Broad- or long-headed. Tall to medium stature. (= CAUCASIAN.)

Homo sapiens asiaticus—Extreme East Asiatic stock. Straight hair (lissotrichous) with round cross section. Broad-headed. Medium to tall stature (American Indian). (= MONGOLIAN.)

Homo sapiens afer—African stock. Closely curled hair (ulotrichous), flattened cross section. Narrow-headed. Short to tall stature. (= NEGROID.)

The spiritual, intellectual, moral, and physical characters which separate these three great human stocks are far more profound and ancient than those which divide the Nordic, Alpine, and Mediterranean races. In my opinion these three primary stocks diverged from each other before the beginning of the Pleistocene or Ice Age. The Negroid stock is even more ancient than the Caucasian and Mongolian, as may be proved by an examination not only of the brain, of the hair, of the bodily characters, such as the teeth, the genitalia, the sense organs, but of the instincts, the intelligence. The standard of intelligence of the average adult Negro is similar to that of the eleven-year-old youth of the species *Homo sapiens*. The wisdom teeth of the Negro are erupted at the age of thirteen; the wisdom teeth of *Homo sapiens* are erupted between the ages of twenty-one and thirty, if at all. The young Negress may in extreme cases produce her offspring at the age of eleven; the early maturing Hindoo woman of Caucasian stock may produce offspring at the age of twelve. Hundreds of other differences might be cited. This is not said in disparagement of the Negroid race, which displays many noble qualities of spiritual and moral character, as observed by sympathetic and unprejudiced travelers like Herbert Ward, whose sculpture¹ has also revealed the superb physical development of the native Negro.

The Mongolian is somewhat less profoundly different from the Caucasian than is the Negro. The intelligence and morale of the Mongolian may fully reach the high Caucasian level, as shown in great periods of Chinese

history, but his physical development seldom equals that of either the Negroid or the Caucasian, which give rise to the tallest races in the world.

The hair happens to be one of the most conspicuously distinctive and constant features of these three species of man. Skin color is less uniformly distinctive. The Mongolians are yellow to dark brown or bronzed in skin color. The Negroids are generally dark brown to full black. The Caucasians are extremely fair-skinned in the North, light-brown-skinned in the South, very dark-brown-skinned in subtropical Polynesian hybrid branches, like the Hawaiians.

Each of these human species interbreeds with the other and produces a great variety of half and quarter breeds. Thus *inter-fertility is not a bar to specific distinction or even to generic distinction in mammals*. In the family of Bovidae, for a parallel, several genera and species freely interbreed, e.g., our domestic cattle (*Bos taurus*) and the bison (*Bison americanus*).

CAUSES OF THE DIVERGENCE OF RACES, SPECIES, AND STOCKS

The color divergence in the Caucasian and Mongolian species is only the most conspicuous of thousands of divergent characters which have been brought about through the long influences of mate selection, of indirect adaptation to climate, of the direct influence of climate, of the influence of habit, and of 'organic' or coincident selection. I am inclined at present to regard the prolonged or secular influence of habit and of organic selection as among the prime causes of the divergence of human characteristics. The opening of the Lord's Prayer, "Give us this day our daily bread," is a recognition of the world-wide fact that the

¹The superb collection of Herbert Ward's sculptures is to be seen in the U. S. National Museum.

primitive man must first think of the food supply for himself and his family. Exactly like an animal, he is compelled to work for his food supply, to seek it where the environment offers it, whether in the chase of animals or birds, in fishing, or in the earth. The search for food has led man into various habits and habitats to which he was more or less fitted by intellectual, moral, and physical predispositions.

These predispositions are hereditary and therefore subject to organic selection. By heredity men may be predisposed to arboreal, to cursorial, to terrestrial, or to amphibious life. The born climbers take to the trees, the born swimmers take to the water, the born runners take to the chase. But in turn these very habits of tree life, of aquatic life, of cursorial or running life, through the process of individual modification and self-adaptation, are self-perfecting. Those who attain the greatest skill and facility are naturally the most successful members of the tribe. They are the best climbers, the best fishermen, the best hunters. They are rewarded by the first choice of wives and blessed with the first crop of offspring. This is the essence of the principle of *organic selection*, a subsidiary principle of Natural Selection, which was independently formulated by Baldwin, Morgan, and Osborn.¹ The illustration which Osborn used is cited on page 11 in 'How to Produce an Arboreal Type of Man.'

Have we wandered far from our subject, the evolution and terminology of human races? Not at all. We have, on the contrary, come to the very heart and philosophy of it, because the genesis of human races was exactly like the

genesis of animal races prior to the era of civilization. Following alike the principle of adaptive radiation, man goes forth to seek and labor for food. He may go to the temperate regions, to the North Pole, or to the Equator. If he chooses the Equator the quest for food is very easy and requires relatively little intelligence; the environment is not conducive to rapid or varied organic selection; the struggle for mere existence is not very keen; the social and tribal evolution is very slow; intellectual and spiritual development is at a standstill. Here we have the environmental conditions which have kept many branches of the Negroid race in a state of arrested development.

The food supply is primarily from the chase, secondarily from agriculture or the quest of natural fruits. The Mongoloid races at a very early stage exhausted their animal food supply and were compelled to turn to agriculture. This explains the extraordinary industry, vitality, and working powers of this people, which are the result of ages of organic selection. A Chinese or Mongoloid workman has far greater endurance and is capable of more continued effort on less food and a lower energy (calorie) diet than the Caucasian, who, until the game supply began to be exhausted in the forests and plains of northern Eurasia, was chiefly a hunter and fisherman.

It is, then, the varied quest for food which is the prime cause of the evolution of the specific and subspecific characters of man. This quest leads him into certain new environments, the new environments compel him to adopt new habits and modes of motion, and the new habits and modes of locomotion produce new modifications and changes of form which are accumulated through organic selection and pre-

¹H. F. Osborn: A Mode of Evolution Requiring neither Natural Selection nor the Inheritance of Acquired Characters. *Trans. N. Y. Acad. Sci.*, Vol. XV, March 9 and April 13, 1896, pp. 141-42, 148.

disposition. This is not the Lamarckian theory of the direct inheritance of acquired characters; it is a theory of prolonged or *secular* inheritance of *predispositions* which happen to *coincide* with the new demands and habits of life. This process of organic or coincident selection operates over very long periods of time.

The new environments also throw all the old adaptations out of balance and put new survival values on certain characters. The heavy beard is a distinct advantage to the Nordic and to the Alpine hunter. The hairy covering of the body is of benefit to the Alpine Slav of the cold plateau regions. On the contrary, the Mediterranean subspecies and the Negroid species develop hairless bodies, partly because hair is unnecessary with a very dark skin, partly because hair and clothing harbor insect carriers of infectious diseases, from which it is easy to protect the nude and hairless body. The Mongoloid races, although partly migrating into the coldest regions of the earth, have never acquired a hairy covering and are as hairless as the Negroids; the same is true of the American Indian.

Individual choice of habit and of habitat, with men as with animals, has by these means been the polestar of evolution. Lamarck in a secular or geologic sense was right when he said that organs were acquired when animals *strove for them*; they are first acquired as non-heritable *modifications*; in the course of ages they are acquired as true hereditary characters. This choice of habit or of habitat has sometimes been optional, a matter of pleasure in choosing between two or more alternatives, and sometimes enforced. Alden Sampson has shown that the white-tailed deer (*Odocoileus macrourus*) of the western states seeks no less than

seventy-three kinds of food during the course of the year. Among the antelopes of Africa there is a great seasonal range of diet for certain species; others, like the *Oribi*, are said to browse only



Photograph by Underwood and Underwood
RUNNING TYPE

Paavo Nurmi, Finnish runner. Observe the feeble arms and strong legs

on a single kind of plant to which the animal is exclusively adapted. Man, like the bear, is naturally omnivorous, but he may be forced to an exclusively frugivorous diet, as among the plantain eaters; to a strictly graminivorous diet, as among the rice eaters; or to an exclusively flesh and fat diet, as in the case of the most northerly Eskimo. An exclusive diet tends to the organic selection of a modified type of dentition, to a modified musculature of the

jaws, and to modification of the digestive tract, all of which organs are extremely modified in the Eskimo.

The choice, however, leads to a readjustment of all the internal and external reactions of man as a mechanism, to a change in all survival values, and to a new series of actions, reactions, and interactions between the developing and race-begetting man and his lifeless and living environment, to use Osborn's tetraplastic and tetrakinetic conceptions of evolution.

HOW A RACE OF TAILORS MIGHT BE PRODUCED

The anatomy and physiology of a tailor as studied by the British anatomist, Sir Arbuthnot Lane, in the year 1888, show that the lifelong habits of a tailor engaged in his confining and laborious trade actually produce a distinct type of man. Such a type, if it became heritable and thus established, might be described humorously as a new variety, *Homo sapiens sartorius*. In the old days the tailor sat with bent form, with crossed legs, jerking his head sharply to the side in drawing the needle and thread with his thumb and forefinger through the resistant cloth—sartorial habits which, if prolonged through a lifetime, produce many new characters. The type is now extinct, for the modern tailor works only at machines.

The following are only a few of the modifications of muscles, tendons, and bones produced in individuals by hundreds of repetitions of similar motion which might conceivably result in the evolution of a hypothetic new variety—*Homo sapiens sartorius*—in which these modifications would be heritable: The muscles tend to shorten and recede into tendons; the tendons grow relatively longer and the bony

surfaces into which they are inserted tend to grow in the direction of the pull which the muscles exert upon them; the articulation between the breastbone (sternum) and the collar bone (clavicle), normally a close junction, is modified into a very complex movable joint almost of the character of a typical hinge joint, like that of the elbow. Owing to the prolonged squatting posture, which compresses the chest and prevents the free rise and fall of the ribs and chest breathing, the six pairs of ribs become firmly coössified with the respective vertebræ of the back, indicating that they had ceased to rise and fall with sternal breathing and that by way of compensation respiration is almost exclusively by means of the diaphragm, which, in the normal human being, supplements the rise and fall of the chest. To accommodate the side jerk of the head which the tailor pursuing his trade for a period of twenty or thirty years repeats thousands of times, the right side of the skull forms a new joint with the broad transverse flange on the right side of the first vertebra of the neck (the atlas). This joint is adaptive; it relieves friction between the side of the skull and the side of the vertebra. A small synovial cavity containing the fluid surrounds this newly acquired sartorial joint. This provision for freedom of movement on the right side of the neck is balanced by a rigid fixation on the left side of the neck because the left half of the second vertebra (the axis) is firmly united by bone to the left side of the third vertebra. Thus the second and third vertebræ tend to form a single bone. This fixation is also adaptive, fitting the tailor to his peculiar mode of living. But Nature does not stop here. Doctor Lane finds that the peglike process (the

odontoid) of the axis is prolonged in its socket of the atlas and that a new transverse ligament is formed to keep this peg from slipping out of place and pressing on the spinal cord. (It is pressure of the axis upon the spinal nerve and rupture of the transverse ligament that produce instantaneous death in hanging.) In brief, the anatomy of the tailor is full of *new anatomic characters*, caused partly by fixation of motion, partly by exaggeration of motion.

These anatomical changes, effected during the lifetime of the individual, serve to emphasize the great contrast between the rapidity of individual adaptation or modification and the slowness of race adaptation or evolution. All these marvelous adaptive modifications die with the individual; none of them is

inherited. The son of this tailor will not exhibit any of these newly acquired characters—his ribs and vertebrae will move freely upon each other. It is only through the slow process of the *coincident selection of predispositions toward the sartorial form of body that a new sartorial race could be produced* in which these sartorial modifications would be *inherited characters*. Again, this sartorial race, like the amphibious or the arboreal race spoken of above, would finally emerge after the selection of hundreds or perhaps thousands of generations of those individuals in which the body is peculiarly adapted

by predisposition to the sartorial habit. All the evidence we have, like that of the fossil horse, for example, shows that modifications produced by peculiar habits, if transmitted at all, would be imperceptible in one generation. The horse has not yet lost its lateral fingers and toes which began to be useless two million years ago, at the beginning of the Oligocene period.

THE INFLUENCE OF HUMAN POSTURE ON THE SKELETON

In a most valuable essay by Arthur Thomson in 1889 upon 'The Influence of Posture on the Form of the Articular Surfaces of the Tibia and Astragalus in the Different Races of Man and the Higher Apes,' we find clearly brought out the distinction between *congenital* variations and those which may be *acquired* by



Photograph by Herbert Lang

SQUATTING TYPE

Belgian Congo blacksmith. Observe the feeble legs

prolonged habits of life. It is perfectly clear from this investigation that certain racial characters, such as 'platynemism' or flattened tibia, which have been considered of great importance in anthropology, may prove to be merely individual modifications due to certain local and temporary customs. Thomson's conclusions are that the tibia or shin is the most variable in length and form of any long bone in the body. Platynemia, i.e., flattened tibia, is most frequent in tribes living by hunting and climbing in hilly countries, and is associated with the strong development of the *tibialis*

posticus muscle. The great convexity of the external condyloid surface of the tibia in savage races appears to be developed during life by the frequent or habitual knee flexure in squatting; it is less developed where the tibia has a backward curve and is independent of platytenemia. Another product of the squatting habit is a facet formed upon the neck of the astragalus (heel-joint bone) by the tibia. This facet is very rare in European man; it is found in the gorilla and orang, but rarely in the chimpanzee. We must therefore be on our guard to distinguish between congenital or hereditary skeletal characters which are fundamental, and 'acquired' skeletal modifications which may not be hereditary.



Photograph by Underwood and Underwood
SWIMMING TYPE

Duke Kahonomoku, the world-famed swimmer from Hawaii. Observe the strong arms and strong legs

THE AMPHIBIOUS LIFE OF THE PRIMITIVE HAWAIIANS

The early explorers were all impressed with the amphibious life of the natives of the 'Sandwich Islands' and with their fearlessness and dexterity. On Vancouver's second journey, in the years 1793-4, he was accompanied by the botanist Archibald Menzie, in whose journal,¹ February 5, 1794, we find the following observations:

After the whole party had breakfasted we left Honomazino in our canoes about nine in the morning and soon after passed the western part of the Island which is a dreary tract of the most rugged rocks of lava scattered here and there with some fishermen's huts. About noon we came to a small village named Manaka where we found our Chief Rookea's residence and where we landed before his house at a small gape between rugged precipices against which the surges dashed and broke with such violence and agitation and with such horrific appearance, that even the idea of attempting it chilled us with the utmost dread. We, however, quietly submitted ourselves to their guidance and were highly pleased to see the extraordinary dexterity with which they managed this landing. Having placed their canoe in readiness before the gape they watched attentively for a particular surge which they knew would spend itself or be overcome in the recoil of the preceding surges before it could reach the rocks, and with this surge they dashed in, landed us upon a rock from which we scrambled up the precipice and in an instant about 50 or 60 of the natives at the word of command shouldered the canoe with everything in her, and clambering up the rugged steep, lodged her safely in a large Canoe-House upon the brink of the precipice, to our utmost astonishment.

In the afternoon our attention was at one time directed to a number of young women who stripped themselves quite naked upon the summit of a pending cliff, and taking a short run vaulted one after another from the brink of it headlong into the sea, regardless of the foamed and agitated appearance of that element, and as it were setting its wildest commotions at defiance, for at this time the surf ran very high and dashed with furious

¹See Hitchcock: *Hawaii and Its Volcanoes*, p. 65.

force against the cliff, yet they dexterously disentangled themselves, and clambering up the rock again, repeated their leaps several times with seeming satisfaction till they were quite fatigued. The cliff was at least thirty feet high and so very rugged with packed rocks which were now and then deluged with a boisterous surf, that to look down the precipice was enough to intimidate any one not accustomed to such extraordinary feats of activity.

More recently so trustworthy an observer as Frank Bullen¹ describes a feat of which he was eye-witness. Half a mile from the towering mass of Sunday Island, exposed to the full force of the gigantic swell of the South Pacific, a young Kanaka sailor left the boat, landed in a weltering whirl of rock-torn sea, climbed the steep sides of the cliff and seized a wild goat, the object of his quest. In the struggle both lost their footing and tumbled down the cliff in a small avalanche of stones and dust. Although badly battered—not by his swim but by the fall—the man lashed the goat to his naked body, ignoring its struggles, crawled out on the rocks and dove once more into the turmoil of breakers, returning to the boat in triumph with the goat none the worse for the experience.

HOW TO PRODUCE AN ARBOREAL TYPE OF MAN

As the swimming habit will produce through individual preference an amphibious type, which might be perfected in successive generations through organic selection of the most apt swimmers, so an arboreal type might be produced. Thus Osborn observed in 1896,² in first defining the principle of organic and coincident selection:

If the human infant were brought up in the branches of a tree as an arboreal type instead of as a terrestrial, bipedal type, there is little doubt that some of the well-known early

¹Bullen, Frank T. *The Cruise of the "Cachalot,"* pp. 299, 305-307.

²Trans. N. Y. Acad. Sci., March 9, 1896.

adaptations to arboreal habit (such as the turning in of the soles of the feet and the grasping of the hands) might be retained and cultivated; thus a profoundly different type of man would be produced. . . . During the enormously long period of time in which habits induce ontogenic variations, it is possible for natural selection to work very slowly and gradually upon predispositions to useful correlated variations, and thus what are primarily *ontogenic variations* become slowly apparent as *phylogenic variations* or congenital characters of the race. Man, i.e., *Homo sapiens*, for instance, has been upon the earth perhaps seventy thousand years; natural selection has been slowly operating upon certain of these predispositions, but has not yet eliminated those traces of the human arboreal habits, nor completely adapted the human frame to the upright position. This is as much an expression of habit and ontogenic variation as it is a constitutional character.

At the time the above passage was written, Osborn adopted the widespread current faith in the direct arboreal ancestry of man. Robinson's well-known photograph of the baby clinging to a broom handle, with its feet turned in, had just been published, and no fossil human skeletons were known at the time to rebut the prevailing arboreal hypothesis. Since then the complete skeleton of the Neanderthal man has been discovered, and the balanced proportions of the upper and lower limbs lend no support to the arboreal hypothesis. The Neanderthal man is descended from many hundreds of thousands of generations of *walkers*, not of tree climbers. Another line of evidence *against* the arboreal theory has recently come to mind. It is that when man does take to the trees it is never in the manner of the chimpanzee or of the gorilla, but in the manner of the bear, i.e., of "shinning the tree," by embracing the trunk with the arms and shins. No anthropoid ape displays this power, which is among the early instincts of



Photograph by Herbert Lang

CLIMBING TYPE

Climbing pygmies of the Belgian Congo. No monkey or ape climbs in this manner

every boy. The ape must rise into the tree not by the trunk route but by the branches. Once started, the swinging action resembles that of a man on a trapeze. The grasping is done with all five fingers, including the rudimentary thumb *placed around the branch*. The thumb is not used either by the ape or by the trapeze expert, because the hand must instantly hook itself over the branch. Consequently the thumb is not developed and all arboreal mammals are practically thumbless.

As a boy of ten the writer watched

the Spanish lads near Murcia, Spain, climbing the date palms. They placed a fibre girdle around the slender trunk and, swaying backward and forward, arose by slipping the girdle higher and higher, turning the soles of the feet inward on the outer sides of the trunk. This method of tree climbing, with all its variations, is purely a human achievement. As tree climbing is observed among the Hawaiian boys, no girdle is used. The slender trunk of the cocoanut palm is seized by the hands and, where possible, the body leans backward and the feet are placed sole downward against the trunk.

DISTINCTION BETWEEN HUMAN AND ANIMAL EVOLUTION

The great distinction between these sartorial, amphibious, and arboreal adaptations in man is that they are relatively temporary—matters which may endure for a few years, or at most for a few centuries—whereas corresponding adaptations in animals are *secular*; they certainly extend through enormous periods of time corresponding with the great secular changes in the earth's surface. If we could imagine all mankind forced into a sartorial or an amphibious mode of life for thousands or hundreds of thousands of years, then we should have a real parallel between human and animal evolution.

Among animals, however, we observe a parallel to man evolving under the 'adaptive radiation' and 'organic selection' principles in the comparison between the psychology and the mechanical evolution of the various races of the horse. The horse and the elephant both resemble man in the resourceful and intelligent selection of habit and habitat. They are the only mammals that rival man in seeking food and in overcoming all natural

difficulties in every region of every continent except Australia. Horses would swarm in Australia if once they had a footing there. The greatest enemy of the horse, as well as of man, has been insect-borne infectious diseases. This debar the horse, as it does the white and yellow races of man, from the insect-laden tropics.

There is, however, one very fundamental difference between the mechanical evolution of man and of the horse, namely, that the latter has been mainly a *single-track* adaptive evolution from the very beginning, whereas man evolved in three phases, each of which has left some traces in his anatomy:

(1) a quadrupedal terrestrial phase, extremely remote.

(2) a quadrumanous arboreal phase, still very remote.

(3) a bipedal and bimanous terrestrial phase.

Opinions differ as to the length of these phases and their relative antiquity in geologic time. The matter will be settled positively only by palæontologic discovery. In the writer's opinion, which differs radically from that of many of his colleagues, *the quadrumanous arboreal phase in man was never a very profound or exclusive mode of life*. The anatomical evidence does not point to a prolonged period of arboreal existence, but rather to a prolonged period of terrestrio-arboreal habit, during which our very remote ancestors lived and fed chiefly upon the ground but sought protection from their enemies in the trees. In brief, we do not believe the case has been proved for arboreal man, chiefly because neither the human leg and foot nor the human

arm and hand retains proofs of prolonged arboreal adaptation; on the contrary, the human hand is of a non-arboreal type, as far as possible from the thumbless, trapeze-motion hand of the gibbon. Secondly, the human foot retains no traces of the grasping foot and big toe of the higher apes. In brief, the better we understand the human anatomy and mechanism and the more we learn of the fossil ancestors of man, the less close appears our relationship to the great anthropoid apes, the gorilla, the chimpanzee, the orang, and the gibbon, which pass from the terrestrio-arboreal to the super-arboreal phase in an ascending scale of structure.

CONCLUSION

Our conclusion from the world-wide studies and observation of the post-Darwinian period is quite contrary to that of Quatrefages quoted at the beginning of this article. We have discovered that 'species' and 'genera' of man arise in the same manner that races, species, and genera arise among other mammals. This is for the reason that the creative evolution of primitive and of uncivilized man is subject to the same laws as those which prevail throughout the animal kingdom, until human Civilization steps in and interferes with the natural orders of things. Thus when man begins to specialize and races begin to intermingle, Nature loses control. It appears that the finest races of man, like the finest races of animals, arose when Nature had full control, and that man is upsetting the divine order of human progress.



Courtesy of the Field Museum of Natural History

BAGOBO (MALAY) OF THE SOUTHERN PHILIPPINES, CUTTING TEETH TO POINTS



Courtesy of the Field Museum of Natural History

Pygmy women of the Malay Peninsula

Peoples of Malaysia¹

By FAY COOPER COLE

Professor of Anthropology, University of Chicago

THE region known as Malaysia extends from the Malay Peninsula on the west to the borders of New Guinea on the east; and from the line of islands which fringe the southern coast of Sumatra and Java to the northern extremity of Formosa.

It derives its name from the principal ethnic group which inhabits it—the Malayu or Malay, but this does not imply that all its inhabitants are of one race, of a uniform stage of advancement, or under one political control; neither does it mean that all people closely affiliated with the Malay reside in it, for racially, a considerable part of the inhabitants of Siam, French Indo-China, and Burma belong to this division of mankind.

Politically, Malaysia falls under the control of Great Britain, Holland, France, Portugal, the United States, and Japan, while the former rule of Spain in the Philippines and of China in Formosa has left a deep impression on those islands.

PYGMIES

The first inhabitants of Malaysia were doubtless pygmy blacks, a rem-

nant of whom still exists in the Malay Peninsula, the Philippines, and the Andaman Islands in the Bay of Bengal. No pygmy groups are now to be found in Sumatra, Java, or Borneo, but the frequent occurrence of individuals exhibiting Negroid characteristics leads us to the belief that they once inhabited practically all of this island world.

Culturally these people are among the lowest known today. Their garments are strips of beaten bark; they build no permanent dwellings, and have no domesticated animals, other than an occasional dog or a wild rooster used as a decoy in trapping; and they practise no agriculture, except in regions where they are much influenced by their neighbors.

How such a primitive people could have reached isolated islands over such great distances has long been a puzzle. Since they are not seafarers such a feat seems quite impossible for them today, yet it is unlikely that they ever possessed a higher culture than at present.

It has been suggested that their dispersal over this region was at a time when Malaysia formed a part of the

¹The material presented in this article, as well as the photographs, were gathered by Doctor Cole during three expeditions into Malaysia made for the Field Museum of Natural History.

Asiatic mainland,—a contention which is strengthened by the distribution of certain plants and animals over the islands as well as in China in the north and the Malay Peninsula in the south.



Courtesy of the Field Museum of Natural History

Pygmies of Malay Peninsula with Captain Berkeley, governor of Perak

Many theories have been advanced to account for the origin and dispersal of the pygmies. Some consider them as the little modified descendants of a very ancient race, ancestral to all other Negroids and hence our nearest approach to primitive man. Others regard them as a recent, degenerate branch of the Negro, the result of long continued malnutrition, lack of functioning of certain glands, and other causes which the length of this paper will not allow us to discuss.

For our present purposes it is enough to say that the pygmies at one time occupied all the archipelago; that they have left a trace of their blood among the invading groups and hence must be

considered in any discussion of the physical types found in Malaysia.

In height the men average about 146.5 cm., the women a little less. Their heads are short, broad and low, with an average cephalic index of 82. The forehead is low and receding; nose broad, often with such spreading wings that the width exceeds the length; the lips are thick and protruding; the chin feebly developed. In general, they appear well proportioned, although actual measurements show the arms to be somewhat longer, when compared with the legs, than is the case with the Malays and whites. The hair is closely curled or woolly, while the skin color varies from a chocolate brown to very dark sepia. Thus they appear much like the African Negro, except for their stature and their brachycephalic or round heads.

They were never a powerful people, but from the earliest times have been broken up into small nomadic bands which waged a never ceasing struggle for existence against the jungle and its inhabitants, a struggle so keen that only the strongest children survive and an aged person seldom is seen. Yet the contest is staged in a land of plenty, where jungle fruit and tubers are to be had for the taking, where deer, pigs, monkeys and squirrels abound, and the streams are stocked with fish and snails. Nets and traps, and bows and arrows make it possible to supply most of their needs, but the most deadly weapon was and is the blowgun, through which tiny darts tipped with poison are blown. When game is plentiful the pygmies feast, but if the hunt has been unsuccessful or if bad weather keeps them at home, they fast. Except in a few regions where they are much influenced by their neighbors, they have no fields; they store no food against a



Courtesy of the Field Museum of Natural History

Group of pygmies on the Island of Palawan, Philippine Islands



Courtesy of the Field Museum of Natural History

Typical pygmy men of the Malay Peninsula

time of need, and so real periods of privation are frequent and the weaker members of the community suffer.

Their houses, for the most part, are mere windbreaks of leaves; and the best is nothing more than a framework of sticks covered with leaves beneath which is a raised floor serving as a bed, table, and reception room. If the night is cool or the mosquitoes troublesome, a fire or smudge is built below so that the inhabitants can sleep in peace; but, more often, when bedtime comes, they pull the burning embers from the bonfire and curl up in the hot ashes. This does not make for cleanliness, but this troubles the pygmies not at all. They seldom bathe. At times they rub the body over with grease until it shines, but the next sleep in the ashes turns them a dull gray. Their neighbors tattoo their flesh, but the pygmy skin is so dark that this ornamentation would not show, and to make up for this they scarify their backs and arms. Gashes are cut and dirt and soot rubbed in so that the wounds will become infected and large raised scars will be assured. They further beautify themselves by cutting, filing, or breaking their front teeth into points. And so they live happy, carefree lives, quite unconcerned by the change and progress of the neighboring lowlands; but they are rapidly vanishing and another fifty years may find them gone.

THE SAKAI

Another group which must be mentioned is the Sakai, a pagan people of the Malay Peninsula, now found only in the mountain forests and in a few valleys not yet appropriated by the Malay. Here we seem to have a situation quite the reverse from that encountered with the pygmies. The latter appear today, as they have always been,

an exceedingly primitive people, but the Sakai give evidence of having had a much higher culture which has broken down through contact with invaders. As the Malay pressed in from the coast they drove the pagan tribesmen before them, seized their lands, enslaved them, and always despised them. The Sakai apparently lacked the organization to resist, and, little by little, retired toward the interior where they came into close contact with the pygmies who, in turn, were driven deeper into the jungle. This process has been going on for generations and still is in progress, so that we find the Sakai in all stages of transition. The first groups met by the investigator are those which have worked out a satisfactory relationship with the Malay. They make their clearings near to the invaders, and provide them with game, rattan, gums, and other jungle products, in return for which they receive some tawdry products of civilization. Their homes are poor imitations of those of their neighbors, while the furnishings are the scantiest. They are entirely under the control of the higher group, with which there has been considerable intermixture.

Far in the interior are the bands which have followed the line of least resistance; have almost entirely given up agriculture; and now lead a life not far removed from that of the pygmy. They have, in fact, freely intermarried with the latter until in many cases it is difficult to say in which division they should be placed. Between these two extremes we have the remnants of an older culture. Often the whole group lives in a rectangular house raised high above the ground on piles. Along one side of the building runs a corridor, in which the cooking is done, and back of this are the family compartments.

A head man, usually one of the oldest of the group, has nominal control over this house and perhaps two or three neighboring dwellings of similar type.

Surrounding the settlement are the fields—clearings made in the forest. Small trees and underbrush are slashed, then the larger trees are deeply cut on one side, so that when a certain tree is cut, it will fall on another, and this on still another, until a wide path is made across the clearing. Later, these are fired and then the men go through the fields with sharpened sticks, punching holes in the ground. The women follow, drop seed corn or rice into the holes, push back the dirt with their feet, and the planting is complete. Rude fences and traps are built around the fields to keep out deer, wild pig and other intruders, and during the time the grain is ripening it is constantly guarded by members of the family. Logs left after the burning are seldom removed, since the white ants eat the dead wood in one or two seasons and leave the fields clear. The owner does some weeding, but soon after the jungle is removed, a rank grass invades the land and within one or two seasons the planter finds it easier to cut a new opening in the forest rather than to combat the grass with the primitive implements at his command. Work in the fields is largely communal, the whole group going from one plot to another until all are prepared. The owner of the land has first claim to the crop, but should disaster come to a neighboring field, or should any be in want, he readily shares his wealth. For one to have a surplus while another is in need is in true Sakai society unthinkable. Chickens and pigs are found in every settlement and are highly prized as food, but no one would think of eating an animal raised in the

same house or settlement as himself. Pressed for an explanation the Sakai will shrug his shoulders and reply, "Just like eating your own family." He does not hesitate, however, to trade his birds or animals with another settlement and then eat his new possessions.

All Sakai make use of the blowgun. The principal poison is secured from the *upas* tree (*Antiaris toxicaria*). Deep cuts are made in the bark and as the sap flows out it is caught in bamboo tubes. It is then boiled down until of the thickness and color of tar, when it is spread on a bamboo spatula and allowed to dry. When needed it is dampened and the end of the dart is rolled in it until a thin layer adheres. At the other end of the dart a cone of pith is attached and the missile is complete. With his blowgun ready, the Sakai slips quietly through the jungle, never breaking a twig nor making a sound until he sights his prey. A dart is inserted into the tube, and slowly the hunter raises it to his lips. A single puff into the tube sends the missile flying noiselessly toward its victim. The animal is seldom frightened even if struck, but soon the poison gets in its work. The Sakai cuts a bit of flesh away from the wound and the game can then be eaten without any ill effects.

Some traps are used for game, and funnel-shaped basket traps are placed in streams in such a way that all fish passing down with the current must enter. Then the stream above is beaten and rocks are overturned so as to drive the fish down and into the trap. Snails, jungle fruits, and tubers likewise furnish foodstuffs, so that under ordinary circumstances the people have plenty.

When near to the Malay the men



Courtesy of the Field Museum of Natural History

Group of Sakai hunters with blowguns

wear clouts of cloth, while the women employ a wrap-around skirt of similar material; but in the mountains, beaten bark takes the place of cloth, and a fringe or kilt of shredded leaves serves as a skirt. The upper portion of the body is seldom covered and is never tattooed, but the faces are painted in red, yellow, and white designs. The septum of the nose is pierced and porcupine quills or tapering rods are worn cross-wise of the face. The women also wear bamboo combs, not for use, but for ornament and protection, for each bears a magical symbol which wards off danger and evil spirits.

We have already seen that the Sakai have mixed with the Malay on the one hand and the pygmy on the other, so that they frequently present characteristics of each. This accounts for the theory often advanced that the Sakai are the result of a fusion of these two. Such a solution does not take account of the fact that the majority of the group have rather long, narrow heads, while both Malay and pygmies have short heads. In general, also, the nose is thinner and higher than in the other groups. The average stature is about 150 cm., but individuals are found who are below the average of the pygmy,

while others tower above the Malay. The hair is likewise variable, some is long and straight, some hangs in ringlets, while in some cases it is short and woolly as in the negro. Pygmy blood is also evident in the dark skin of some individuals, but the majority are a yellowish or reddish brown with a distinct gray undertone.

The language seems to belong to the Mon-Khmer group and thus, together with other anthropological data, seems to justify us in believing that they show closer affinity to the Mon-Khmer than to any of the neighboring peoples.

THE MALAY

The last people we shall consider is the Malay—the most numerous and most advanced in Malaysia. They are



Above: A fifty-year old Sakai woman, one of the wild pagans of the Malay States.

Left: Sakai women of the Malay Peninsula. *Photographs by courtesy of the Field Museum of Natural History*



generally described as being short in stature—about 160 cm.—of slight build, with round heads, rather narrow but low noses, and thick lips, straight black hair and yellowish brown skin. Such a description would fit most of the coast people, and a considerable proportion of the interior tribesmen, but it would need to be considerably modified to include all the Malay. In some groups



A Tinguian gentleman—a typical pagan Malay. Photographs by courtesy of the Field Museum of Natural History

many of the people are of stocky build, have longer and narrower heads, longer and broader noses, thicker lips, and the hair is distinctly wavy. Some investigators have applied the name Indonesian to this type, but this must not be interpreted to mean that there are any true Indonesian groups or tribes in Malaysia, for the type is found in every part of the archipelago thoroughly fused with the typical Malay.

To the writer the evidence seems to indicate an early movement into Sumatra, Java, and adjacent islands of a people closely related to the Polynesians. From time to time they were joined by groups of southern Mongoloids, some of whom came in by way of the Irawadi, some by the Salween, Mekong, and other rivers. The newcomers brought in some new elements of culture, and also modified the physical type, but apparently were not strong enough to impress their language. The speech of the earlier settlers remained dominant and gave rise to the language now called Malayo-Polynesian.

The movement of southern Mongoloids into Malaysia appears to have been slow but continued until there was a thorough mixture of the two

groups in the main islands, but in the more remote regions the Polynesian element was still dominant. Finally, the pressure of population carried a part of these marginal groups out into the islands toward the east, while the



Courtesy of the Field Museum of Natural History
One of the so-called Indonesian men of the Southern Philippines

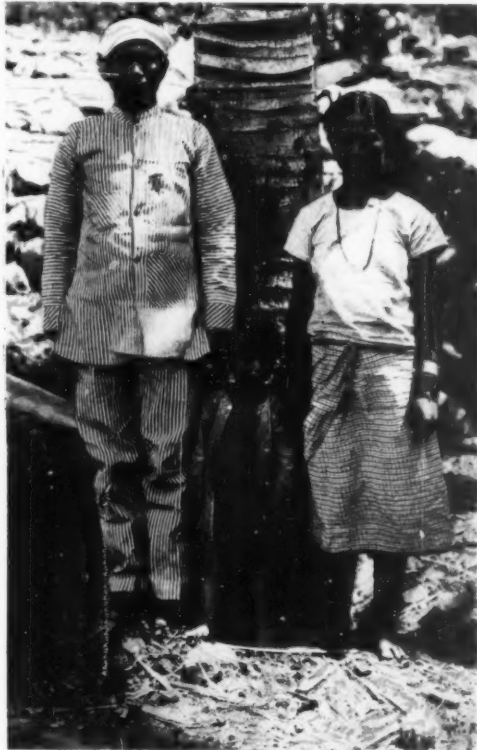
mixed people we now call Malay pushed their way north through the Philippines to Formosa. There has been intermixture with other peoples in the new homes, and conditions of life have doubtless left their impress on physical type, but if this theory is correct the chief difference between Polynesian and Malay is the greater amount of Mongoloid blood in the latter. However, there are many groups in Malaysia in which individuals closely approximating the Polynesians are still to be found.

It appears that the various groups coming into Malaysia not only entered by somewhat different routes, but that in their homeland they had developed customs often quite radically different from those of their neighbors, customs which they have preserved with surprisingly little change up to the present. In some regions the people are divided into clans or gens, yet the vast majority of the Malay have neither. The bachelor's house, trial marriage, and even polyandry appear in very primitive groups, yet others equally primitive have no such institutions. Terraced rice fields and a highly developed

economic life are found within a few miles of a region where hoe or dibble culture is of about equal importance with hunting and fishing.

In historic times the coast Malay has been profoundly modified by contact

with India, China, and the colonizing powers of Europe, but in the interior of many islands are still to be found groups living the life of former times. One of the most interesting of these is the Tinguian—a powerful pagan tribe of northern Luzon. The rugged mountains of their homeland are but little wooded and the streams are uncertain, so that hunting and fishing are of minor importance and the people are forced to agriculture.



Courtesy of the Field Museum of Natural History
A Tinguian family of Northern Luzon, showing the influence of their civilized neighbors in dress

Lacking level ground, they have terraced the mountain-sides so as to provide fields. Rice is their chief crop and on its cultivation they will labor unceasingly, but when the harvest is over they indulge in many festivals and ceremonies.

Some of these are purely social, but most have as their object the gaining of favor with superior beings. A whole host of spirits, some good, some bad, are known to the Tinguian; in fact, he



Courtesy of the Field Museum of Natural History

Tinguian women seeding and bushing cotton

is on very intimate terms with the spirit world, for he talks to its members through mediums. At times of ceremony the superior beings enter the bodies of chosen men or women who are no longer considered human but as the spirits themselves; and under their guidance the people do many things to bring health and happiness to the group. A birth, marriage, sickness, or death, or any event of importance calls for a ceremony, but it is likewise a social event to which people will come from all neighboring villages.

During the dry season fires are built in various parts of the village and around these the women gather to spin, the men to make fish nets, while some good story-teller chants the tales

of long ago or tells of the fighting prowess of the fathers. The Tinguian are not far removed from the days of head-hunting and it is still the proud boast of many a man that he has fought in the villages of their enemies.

Child betrothal is common and marriage usually takes place before either of the couple has reached puberty. A price is paid for the girl, but she is in no sense a slave; she holds property in her own name and passes it on to her children. She takes care of the house, looks after the children, brings water from the village spring, assists her husband in the fields, and in her spare time makes pottery, spins, or weaves. Her husband, for his part, is no laggard, but does the

heavy work in the fields, cares for the water buffalo, makes knives and head axes on his primitive forge, and until recently was an enthusiastic head-hunter. Occasionally he fishes and hunts, but this is a sport, not a necessity.

The government is purely local, each village selecting one of its old men to act as its head, but he has little actual power and can be replaced at the will of the group. Custom is law and violation of custom results in ostracism of the offender until such a time as he is ready to conform.

Of his own volition the Malay has never developed a strong government. He has shown himself to be very adaptable and has progressed far toward civilization under the leadership of more advanced groups. The culture of the Tinguian is probably much the same as that of the more advanced Philippine tribes at the time of the Spanish occupation and a comparison of their life with that of the Christianized Filipino throws much light on the possibility for advancement in the Malay race.



Courtesy of the Field Museum of Natural History

Tinguian playing the nose flute

Span of Life and Average Duration of Life

By RAYMOND PEARL

Institute for Biological Research, Johns Hopkins University

FREQUENTLY in newspapers, magazines, and other forms of popular literature where precise accuracy cannot be expected, and only a little less often in technical journals, one meets the following statement or its equivalent: "In the last quarter century, the span of life has been lengthened."¹ There is not the slightest evidence that the *span* of human life has been lengthened in the last two thousand years, let alone the last twenty-five. What the ignorant or careless users of phrases like that quoted really intend to convey, of course, is that the mean or average duration of life has lengthened in the last quarter century. It is probably hopeless to expect that workers in the biological sciences will in the near future, at any rate, use words with that precision, and with that careful regard for their rigorously defined meanings, which students of mathematics and of physics have for a long time been accustomed, and indeed compelled, to exercise. But it so happens that the one field of biology in which prevails the same standards of precision in the definition of concepts that we are accustomed to in physics, is that field which has to do with duration of life, and is commonly called actuarial science. Hence the medical or other writer who misuses terms in this field cannot attempt the alibi that, there being no definitions recognized as standard, his are as good as another's.

In the actuarial universe of discourse "span of life" has no status whatever.

When it is desired to discuss what the writer of the quoted editorial note wanted to talk about, the expression "expectation of life at birth," or "mean after-lifetime, at birth" is used. "Mean (or average) duration of life" has the same significance and is an entirely acceptable substitute even in technical writing, provided it is made clear that the writer is not confusing "mean duration of life" and "mean age at death" in his thinking. These two things are the same in a stationary life-table population, but may be distinctly different in actual general populations, as Farr long ago pointed out.

"Span of life" denotes a concept impossible to define precisely. It is correctly used when one says: "The span of life of horses is roughly 20 to 25 or perhaps even 30 years, while that of man is somewhere about 100 years." The *span* of life, in short, is its total extension between its biological lower and upper *limits*. Limiting values of any thing are extremely difficult to determine precisely. In the present state of knowledge it is impossible to define the span of either equine or human life any more exactly than is done in the second sentence of this paragraph. Furthermore, there is no such thing as an absolutely fixed and determinate biological upper limit to the life span. The upper limit of human longevity is quite certainly a variable matter, for which an average value may be determined if one has sufficient data, but there is no particular single age at which the ax inevitably descends. Individuals alive

¹Journ. Amer. Med. Assoc. July 19, 1925, p. 197.

at any particular age, no matter how high, still have an expectation of life after that age. This expectation may be difficult to measure, because of lack of data, and it may be minute in magnitude to the point of seconds of time, but always an average after-lifetime is theoretically calculable. This is even true of the cohort composed of the one person who has lived longer than any other one ever did. Theoretically he has a calculable expectation, but practically it cannot be determined merely because of lack of statistical data.

But if it is difficult to measure the biological upper limit of life, it is even more trying to extend it. On the other hand the mean duration of life not only has a precise significance, but as events have shown, can be greatly extended, so far as human beings are concerned, by proper attention to sanitation and the application of curative and preventive medicine. The accomplishments in this direction are notable and redound enormously to the credit of the medical profession. They have so far been made chiefly by lowering steadily the death rates in infancy and the early portion of the human life span. When the death rates from say age 75 to 100 have been

measure the extent of the accomplishments in this direction with anything like really scientific accuracy. Life table studies made in the Department of Biometry and Vital Statistics of the School of Hygiene and Public Health of this University show that for Baltimore City in 1870 and 1920 the expectations of life at birth were respectively 33.7 years and 51.5 years. These figures relate to the whole population (male and female, white and colored) and are approximate only. The 1870 figure is probably a little too low, owing to defective statistics for that year, but the discrepancy probably does not amount to as much as two years, and the 1920 figure is probably not in error from the unknown true value by as much as a half year. We see here the very substantial gain of 17.8 years in mean duration of life in this community in a half century, taking the figures at their face value, and it may be regarded as certain that the gain has been as much as 15 years. For the larger and more heterogeneous population of the original registration states (which include the New England States, New York, New Jersey, District of Columbia, Indiana, and Michigan) we have the following data¹

EXPECTATION OF LIFE AT BIRTH. ORIGINAL REGISTRATION STATES

	1901	1910	1919-1920	Gain 1901-1910	Gain 1910-1920	Gain 1901-1920
White males	48.23 yrs	50.23 yrs	54.05 yrs	+2.00 yrs	+3.82 yrs	+5.82 yrs
White females	51.08 yrs	53.62 yrs	56.41 yrs	+2.54 yrs	+2.79 yrs	+5.33 yrs
Negro males	32.54 yrs	34.05 yrs	40.45 yrs	+1.51 yrs	+6.40 yrs	+7.91 yrs
Negro females	35.04 yrs	37.67 yrs	42.35 yrs	+2.63 yrs	+4.68 yrs	+7.31 yrs

equally lowered, we may perhaps then appropriately begin to speak about "lengthening the life span."

While every one knows that the expectation of life at birth is increasing, it is surprisingly difficult to get data to

enabling a comparison over roughly the last fifth of a century.

¹Data for 1901 and 1910 from Glover, J. W., *United States Life Tables*, Washington, Government Printing Office, 1921. Data for 1919-1920 from Foudray, E., *United States Abridged Life Tables, 1919-1920*, Washington, Government Printing Office, 1923. Both of these are official publications of the Bureau of the Census.

For London it is possible to make reasonably accurate comparisons of the expectations of life at birth over a longer period. The following table is quoted from a recent paper by Sir George Newman.¹

to the improvement of the negro mortality than have been applied to the white population. Perhaps the most probable explanation is that when the general level of mortality is as high as it is among the negroes in cities, any

LONDON LIFE TABLE, 1841-1922

Period	Expectation of life (years)		Period	Expectation of life (years)	
	Males	Females		Males	Females
1841-50	34.6	38.3	1891-1900	41.2	45.4
1851-60	36.4	40.4	1901-10	47.2	51.9
1861-70	35.7	39.9	1911-12	49.5	54.5
1871-80	38.0	42.4	1920-22	53.8	59.1
1881-90	40.1	44.5			

From these figures the following differences appear:

improvement in sanitary conditions will produce a more marked effect than

GAIN IN EXPECTATION OF LIFE AT BIRTH, LONDON MALES FEMALES

From 1901-10 period to 1911-12	+2.3	+2.6
From 1911-12 period to 1920-22	+4.3	+4.6
From 1901-1910 period to 1920-22	+6.6	+7.2

It is apparent from these figures that the gains in expectation of life at birth have been somewhat higher, over the nearest comparable time period, in the population of London than in the population of the Original Registration States.

The explanation of the generally greater gains of the negroes as compared with the whites, especially since 1910, is not entirely clear. It can scarcely be seriously maintained that more, and more effective, public health efforts have been directed during these years

it will in a population already enjoying a low mortality rate.

Now while all these gains in expectation of life at birth are extremely impressive, the case wears a wholly different aspect when expectation of life (= mean after life time) at age 77 is considered. This odd age is taken rather than 75 or 80, in order to compare Miss Foudray's figures directly with those of the earlier years, without interpolation. From the same sources as before, we have for the Original Registration States the following data:

EXPECTATION OF LIFE AT AGE 77. ORIGINAL REGISTRATION STATES

	1901	1910	1919-1920	Gain 1901-1910	Gain 1910-1920	Gain 1901-1920
White males	6.09 yrs	6.04 yrs	6.17 yrs	-.05 yrs	+.13 yrs	+.08 yrs
White females	6.54 yrs	6.41 yrs	6.61 yrs	-.13 yrs	+.20 yrs	+.07 yrs
Negro males	5.96 yrs	6.15 yrs	5.92 yrs	+.19 yrs	-.23 yrs	-.04 yrs
Negro females	7.32 yrs	6.91 yrs	6.88 yrs	-.41 yrs	-.03 yrs	-.44 yrs

¹Lancet July 25, 1925, p. 165

The irregular gains (+ sign) or losses (—sign) of a few hundredths of a year shown by these figures are without significance. It is to be hoped that any person who is suddenly seized with an urge to write about the lengthening of the *span* of human life will call to mind in time that its upper limiting values are in fact staying about where they presumably have been for a very long time.

But the question as to the *possibility* of lengthening the human life span at some future time must not be unfavorably prejudged because the evidence is that it has not yet been discernibly altered in this sense. There arises here a consideration which I do not recall having seen discussed, but which obviously has an important bearing upon the case. I can illustrate it best

by a form of diagram much used in actuarial work. Suppose the passage of time as measured by years of the Christian era be plotted as abscissa, and age be plotted as ordinate. Then a straight line inclined at an angle of 45 degrees (provided a year has the same value on both scales) drawn between the dates of an individual's birth and death, will represent the passage of his life.

In the present case let us apply this principle of graphic representation to the data regarding the expectation of life of white males in the original registration states at age 77. The resulting diagram is shown as Figure 1.

The persons aged 77 in 1901 were born in 1824, so the uppermost or 1901 line starts from the base (0 age) at the date 1824. Those aged 77 in 1910

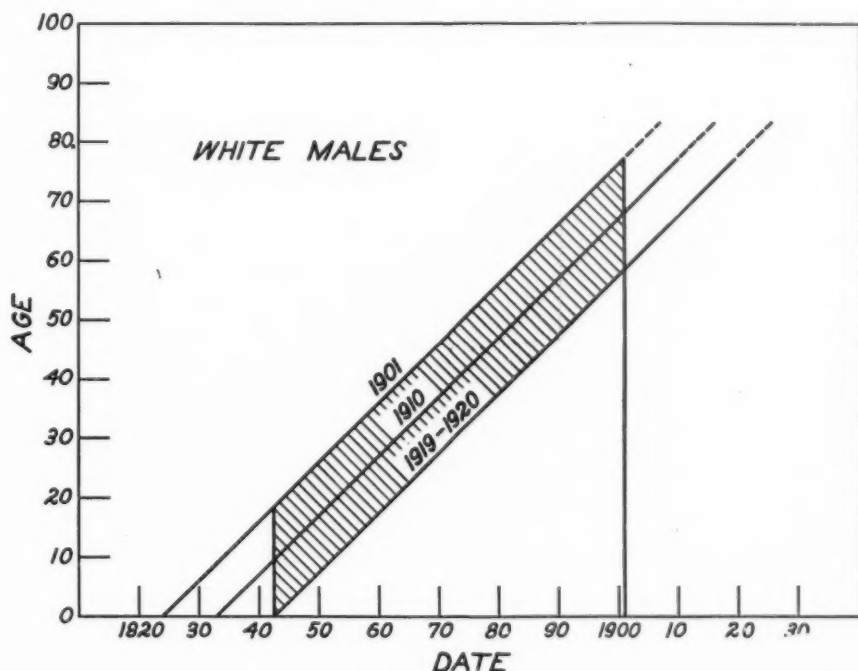


Fig. 1. Showing the expectation of life of white males in the original registration states reaching the age 77 in the years 1901, 1910, and 1919-1920. The dotted lines are the expectations of life and the solid lines the years lived prior to attaining age 77. For further explanation see text

were born in 1833, and the second or 1910 line starts from 0 age on that date. Now if a perpendicular be erected from 1842-1843 to cut the 1901 and 1910 life lines, and another perpendicular be dropped from the 1901 line to cut the base at that date, a parallelogram will be included by these two perpendiculars and the 1901 and 1919-1920 life lines. This parallelogram is crosshatched in Fig. 1. This shaded parallelogram defines the overlapping portions of the lives of persons in the three cohorts under discussion. During the 58.5 years from 1842-1843 to 1901 all of the persons in these three cohorts were alive together. Whatever environmental stresses, whatever improvements in sanitation, whatever discoveries in medicine, acted upon the men in one of these cohorts, acted also during this period of nearly 60 years upon those in the other two cohorts. But this period is a major portion of their whole lives. If it were true, as it may well be, that improved environment, better sanitation, better preventive medical

service are just as effective in reducing mortality rates at the upper end of life as they are at the lower end, one would not expect to see from them any but a slight effect in cohorts not more than 20 years apart at birth. Too great a portion of the whole life of both cohorts would have been spent under the same environmental conditions.

Summarized the situation is this: The evidence available does not indicate that any increase is occurring now, or has occurred in the recorded expectation of life of persons who live to the age of 75 or more. Still less is there any evidence that the biological upper limit of the human life span has been raised. Whether in the future, as a result of what is being done now in public health and preventive medicine, the expectation of life at advanced ages will be raised, is a question impossible of answer at the present time. But in the meantime the expectation of life at birth, or the mean duration of life, has been and is being notably increased.





Above the sea of clouds in the Sierra Nevada de Santa Marta, Colombia, the land of the Arhuaco Indians

Coast and Crest in Colombia¹

AN EXAMPLE OF CONTRAST IN AMERICAN INDIAN CULTURE

By J. ALDEN MASON

Curator of the American Section, University Museum, University of Pennsylvania

TO the ordinary layman reader the term "Indian" calls to mind a vision of a tall, high-cheeked, red-skinned man, decorated with feathers and gaudy beads, taciturn in disposition, his character a curious melange of nobility and treachery. The Scot may differ radically from the Welshman, the German have little in common with the Frenchman, but the Indian is still an Indian, whether he till his patches of sun-burnt corn on the arid flats of Arizona or spear fish by the humid marge of a lethargic Brazilian river. Even those persons of wider reading who recognize the great variations in physique, in psychology, in language, and in culture, which obtain among the many hundreds of tribes and nations of American Indians, seldom realize the full extent of these differences or how sharp the division

between groups which may be close neighbors.

Differences in language, in physical type, in religion, social organization, and similar respects, more or less transcend the boundaries of geographical and ecological areas, but differences in material culture are to a large extent dependent on the natural environment upon which the tribe must subsist and to which it must adapt itself. In the United States, variations in these environmental conditions, though great, are never sudden and abrupt, with the result that the boundaries of material culture areas are never sharp-cut and variations from group to group are slight. In other parts of America, however, and especially in western South America, abrupt changes in altitude produce natural environmental areas of the

¹Photographs taken by the author while on an expedition to Colombia for the Field Museum of Natural History.

greatest divergence within the space of relatively few miles, and these in turn have produced, or at any rate support, native populations of widely different character.

Such a region of diverse natural environmental conditions is found on the northern or Caribbean coast of Colombia between the Magdalena River and the Lake of Maracaibo. Here is a little-known and seldom-visited region, dominated by the little seaport of Santa Marta, the oldest city on the South American mainland, which last year celebrated its four-hundredth anniversary, having been founded in 1525. For the first few years of its history it enjoyed a slight meed of prosperity as the seaport of Colombia, from which sailed the galleons laden with the treasures of the land of El Dorado to enrich the insatiable coffers of Castile and Leon, if peradventure they escaped the even greedier clutches of the English gentlemen-pirates of the Spanish Main. Then it lapsed into centuries of somnolence from which it is only just awakening by virtue of the new golden harvest, the banana, which today leaves its portals in the immaculate steamers of the United Fruit Company. Behind Santa Marta the majestic mountains of the Sierra Nevada, whose summits have never known the foot of man, rear their peaks to heights of eternal snow. In the cool valleys near the foot of the chill treeless *paramo* dwells a nation, or group of tribes, of peaceful, sedentary, inoffensive Indians, practically untouched by civilization, the Arhuacos. Occasionally, to carry down the blocks of brown sugar or *panela* which they trade for steel implements and other civilized products, a few of them descend to the hot seacoast at Dibulla, a little settlement largely

inhabited by negroes. Here they may meet a few members of another absolutely different Indian nation, also wanderers from their native heath, the Goajiros. But they avoid each other like lepers, pass with averted eyes on opposite sides of the street, and ignore each other's presence. The Arhuaco fears the reputed ferocity and physical strength of the Goajiro and the latter dreads the magical power and "strong medicine" imputed to the Arhuaco. Though their territories impinge so closely, it is difficult to imagine two beings of the same race more different in all respects.

Approximately one hundred miles east of Santa Marta one comes to the open roadstead of Rio Hacha, the seaport for the Goajira Peninsula which extends a hundred miles farther east. Here the lofty wooded mountains have disappeared with their humid verdure, and instead the peninsula is low, arid and torrid. In place of the majestic *caracoli*, mahogany, and other tropical trees, cacti, and thorny bush cover the ground. Herds of stock,—cattle, sheep, goats and horses,—browse on the scanty vegetation, and their hides, together with the *divi-divi*, *brazilete*, and logwood which are gathered by the Indians, form the principal exports of Rio Hacha.

In 1922 and 1923 I spent upward of a year in the region of Santa Marta for the principal purpose of pursuing archaeological investigations for the Field Museum of Natural History of Chicago, with which I was then connected and to which I am indebted for the use of the notes and photographs herein used. During this time I was enabled to spend several months with the Arhuacos and to make a short visit to the Goajiros.

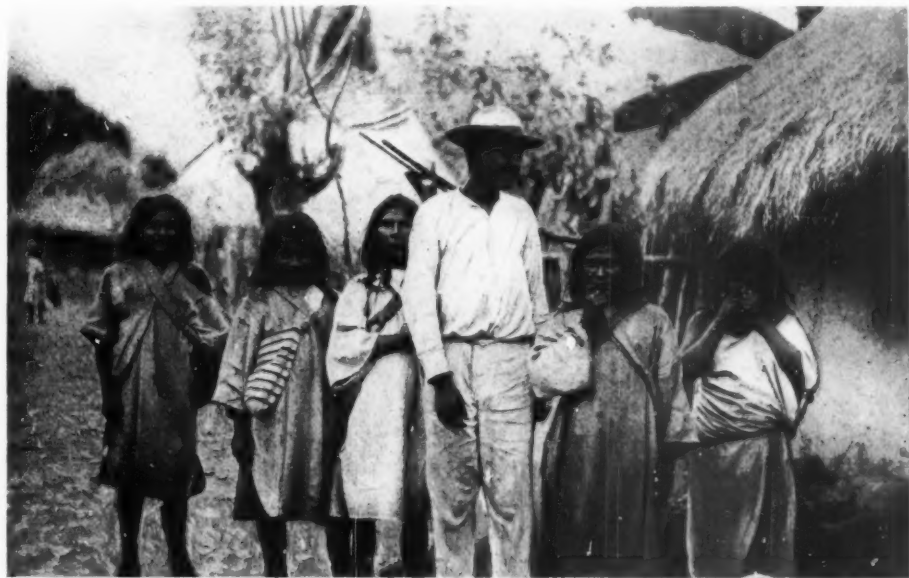
As examples of diverse and contrasted

cultures a slightly more detailed exposition of the life of these two neighboring tribes may perhaps be of interest.

The Arhuacos are an undersized folk, the men averaging little more than five feet in height, and the effect given by this shortness is intensified by their childlike natures. Bashful, reticent, suspicious of all strangers,

only in wrestling and hair-pulling. The women are especially bashful and are seldom in evidence.

Living as they do in the fastnesses of the mountains, separated from the civilized settlements on the coast by great stretches of virgin forest, they are unbelievably ignorant of modern business and are exploited in a pitiful



A group of Arhuaco Indians in a neighboring "civilized" village. Their slight stature is striking in comparison with a tall negro. A woman stands at the right

especially civilized persons, the unannounced visitor is nearly certain to find their villages suddenly abandoned at his approach. But he who, like ourselves, comes accompanied by their friends and preceded by a good repute, finds them friendly and affable. Never boisterous and seldom demonstrative, quietness seems to be the keynote of their natures. Only under the influence of their home-brewed *chicha*, made of cane syrup, or the stronger imported rum, do they expand, and even then the usual effect is a maudlin lugubriousness, and the rare disagreements result

fashion by the few *civilizados* who live on the outskirts of their country and trade them machetes and other needed modern tools in return for loads of *panela*, the blocks of unrefined sugar which are their sole object of export. Money is nearly unknown to them and they accept it in pay for services and products only on the advice and instructions of the village head, always a man who has had some dealings with civilization and who does his best to protect his charges from exploitation. Any offer of pay is referred to him who passes upon the

fairness of the offer and the value of the proffered coin. "We do not like your practice of trade," said one Indian. "We prefer that you should make me a gift, and then I will counter by making you one." It was a most difficult matter to secure any specimens from them. Never once was an article voluntarily offered for sale or barter and only by dint of continued pleading was a small representative collection of their goods secured by listing desired objects and soliciting the aid of the village heads in obtaining them.

Dressed in long tunics which fall to the knees, under which are worn loose baggy trousers—the latter probably a civilized adaptation,—with their long unkempt hair falling over their shoulders and frequently with rather thick beards, the men present a patriarchal appearance such as the imagination ascribes to the Judean shepherds of old. These garments are made of cotton grown, spun, and woven by the men, rather heavy and frequently decorated with violet stripes. But they are generally frayed, worn, and dirty, and the ensemble is unkempt, notwithstanding the fact that the people bathe frequently in the cold mountain streams. The women wear blouses, generally with one arm bare, and short skirts of the same cotton fabric. Their sole ornaments are necklaces which are largely composed of the beads of roseate carnelian found in the graves of the ancient Taironas near the coast. They fear to molest these graves themselves, but eagerly purchase from local treasure-hunters beads of second quality, those without high polish known as *muertos*, being unable to compete with the wealthier Goajiros for the polished beads known as *vivos*.

While the men spin and weave the cloth worn by both sexes, the women

knit the bags carried by the men. Every man or boy bears one or more of these knitted bags in which he carries his flint and steel for making fire,—the modern substitute for the ancient fire-making sticks,—his *poporo* and *tami*, and his coca leaves. The *poporo* is the ubiquitous companion and constant solace of every man, and its acquisition marks the boy's attainment of man's status. It is a pear-shaped gourd in which he carries the powdered lime obtained by burning shells and which is mixed with the coca leaves for chewing. This chewing of coca leaves is one of the characteristics which connect the Arhuacos with the people of the highlands of southern Colombia, Ecuador, and Peru, where the custom has persisted since time immemorial, as is attested by the finds of dried coca leaves and gourds of lime in the ancient graves. This coca, *Erythroxylon coca*, is the plant from which our medicinal cocaine is obtained, and the chewing of its leaves has, in a minor degree, the same anæsthetic effect as the administration of cocaine; it deadens the sensibilities to hunger, fatigue, and pain and enables the hardships of primitive life to be better endured. His tiny plantation of coca is a man's most valued possession; the failure of his crops or the burning of his house he can endure with resignation and fortitude, but the destruction of his *hayal* is a calamity of catastrophic magnitude. Such is the insatiable demand for the leaves that the plants are never allowed to reach a state of efficient production, but the leaves of immature size are gathered by the women, toasted over a slow fire, and emptied into the coca bag. An exchange of a handful of coca leaves is the customary prelude to every meeting or conversation. After a pinch of

leaves has been put in the mouth, the stick is stirred around in the *poporo* until it is covered with lime and then licked off, the mixture of coca and lime providing the desired elements. The remainder of the lime adhering to the stick is then scraped off against the neck of the gourd until a great collar of lime concretion is formed, the size of the collar and the blackness of the owner's teeth being more or less an index of his importance in the community. The rattle of the stick in the *poporo* is the one constant sound in an Arhuaco village, as typical as the "pat-pat" of the tortilla-maker in a Mexican pueblo.

The villages are permanent groups of houses, so close together as almost to touch, in a cleared mountain valley, by a turbulent icy stream. In the more conservative towns the houses are conical and built of thatch of palm or grass on a foundation of poles, but in the more civilized villages rectangular houses with walls of wattle and mud are coming into vogue. They are small and one-roomed, the conical ones being without any smoke-hole, and as the fire in the center burns constantly in these cool heights, long fronds of soot hang from every straw. Upon marriage, the happy groom builds his bride a house into which he never enters and here she and the children sleep on mats. The wife prepares her husband's meals in the house and they eat them outside or he carries his to the men's house. Only in their distant *rozas* or farms do husband and wife associate intimately. But in the center of every village are one or more larger houses, their walls made of a plaited cane. These are at once temples and men's clubhouses, where all the adult men, married or unmarried, sleep in their hammocks and pursue their sedentary occupations. Here the *mama* or native



Mama Miguel, Arhuaco native priest, and his wife and child. He bears a burden band across his forehead and in his hand the ubiquitous *poporo* or gourd of lime and stick



A small boy neophyte, training for the priesthood, dancing with mask and rattle, while other boys supply the organ accompaniment on gourd trumpets

priest holds full sway and here most of the native rites and religious ceremonies are performed. The *mama* enjoys great power and reputation for healing the sick, for legendary knowledge, and for magical practices, and the chief *mama* of the tribe is visited even by white patients from the civilized towns on the coast. The attainment of the rank, however, is preceded by years of novitiate during which abstinence from the use of salt, and all imported food products, and many other restrictions are observed. Apparently there is



The house of the native priest's wife. Like the temple which it adjoins, its walls are built of plaited cane



A typical Arhuaco Indian. The long unkempt hair, occasional thick beard, and long simple garment lend a patriarchal air to the native



Knitting a bag while bringing home vegetables. The Arhuaco women are very bashful and only with difficulty can they be induced to face the camera



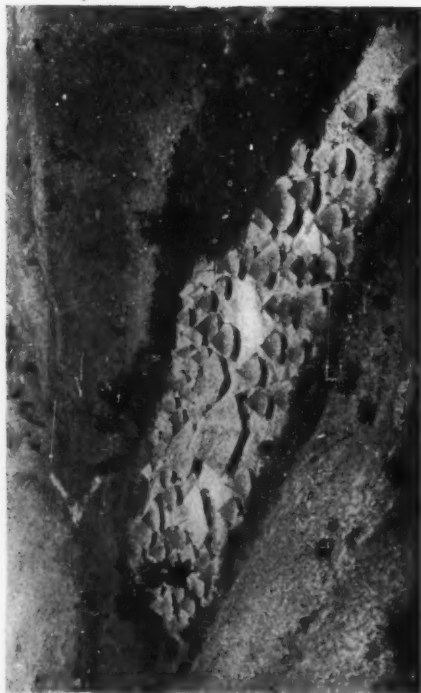
Men twisting *pita* (agave) fiber for rope and braiding selvages on cloth at the door of a guesthouse in an Arhuaco village



Above.—*Mama Miguel*, native priest of Palomino, weaving cloth outside the door of the temple. All the weaving is done by the men. This priest carries two unusually fine knitted bags and wears the old knitted cap worn today by only the conservative elders



Right.—*Mama Miguel* plaiting a fire-fan of reeds. The plaited fire-fan is one of the most constant features of South American Indian cultures. Each tribe has its special type



A



C



B



D

A.—San Miguel, the largest village of the Kagaba-Arhuaco. The larger conical huts are the native temples; the large rectangular houses are the church, guesthouse, and other municipal edifices constructed under the orders of the clergy and civil authorities.
 B.—A native Arhuaco Indian bridge. These are built high to avoid freshets and are made without a bit of metal in their construction.
 C.—Bringing specimens and equipment down from the mountains. The women bear burdens equal to those of the men.
 D.—Arhuaco men (and dogs) eating outside the maternal door. The husband never sets foot inside the door of the house he has built for his bride

little distinction of wealth or social position.

Agriculture is the sole method of subsistence of the Arhuacos, and every family possesses several isolated cultivated plots separated by as much as a day's journey. Due to the abrupt changes in altitude, an Arhuaco will have one plot in the hot lowlands where he raises bananas, yucca, yams, and such tropical foods; another near his village where plantains, corn, beans, coca, and tobacco are grown; and a third near the cool paramo where he cultivates potatoes and *arracacha*, most of these being native pre-Columbian food-products. Practically no hunting is done, firearms are almost unknown and the bow and arrow today is hardly more than a boy's toy. Every Indian of means owns a dog and an ox or two on whose patient long back all transportation is done over the precipitous mountain trails. A few chickens and pigs complete the list of domestic animals, for horses, donkeys, sheep, and goats are unknown.

The larger mountain streams, which become raging torrents in the rainy season, are crossed by means of ingenious bridges built high above the water. These are made entirely of wood tied together with withes and without a piece of metal in their construction. The approach is made of slanting poles resting on forked posts and the main span is of a single log upon which hand rails are erected.

Today the mountainous territory of the Arhuacos has been set apart by the government of Colombia as an Indian reservation, governed directly from Bogotá, but for the greater part they are unvisited and unmolested. The clergy have compelled them to build a large house in the center of each village to be used as a church, but this

is opened hardly more than once a year when a *cura* may come to say mass. So, content in their isolation, they follow in the footsteps of their fathers and forefathers the age-old customs of pre-Columbian America. But life is harsh and children are few, and apparently the nation of the Arhuacos is slowly but surely diminishing and following the dim trail of many another tribe of aboriginal Americans to extinction and almost unrecorded oblivion.

The low, sandy, torrid, arid peninsula which forms the home of the Goajiro Indians is also set apart by the Colombian government as an Indian territory, but the authority of the government is practically nil. For the Goajiros are a fine, vigorous, independent, and upstanding nation, and the little seaport of Rio Hacha has in times past frequently suffered from their depredations in Indian wars. Even today it is dangerous to cross the Goajira to the towns of the Venezuela frontier and one is safe only in company with an Indian or half-blood of standing. Tall, well-formed, rather forward and aggressive of nature, the Goajiro is a magnificent specimen of the American Indian, resembling somewhat our Navajo or Sioux. When under the influence of liquor he is inclined to be quarrelsome and dangerous. Though living in a relatively aboriginal state, he is well acquainted with the practices of modern business, since he gains his entire livelihood by stock-raising, and is a keen bargainer and trader. I secured more specimens from them in a week than in two months among the Arhuacos. The natives for miles around brought in objects of all kinds for sale and only the constant assistance of my companion enabled me to keep up with the brisk business. The

women, too, are magnificent specimens, not only of physical womanhood, but of quiet and self-possessed capability and efficiency. Some of them are married, practically sold, to merchants of Rio Hacha, for whom they carry on business with the natives in their camps.

The men normally wear nothing but a breech-cloth, necklace, and headband, but possess gorgeous and expensive robes and trappings which are worn on ceremonial occasions. These beautiful robes are woven of cotton by the women and sell only for high prices. The gaudy horse-trappings are made by the men. The hair of the men is worn relatively short.

The women wear a great voluminous enveloping Mother Hubbard wrapper of purchased cloth. Though naturally

comely, to the stranger their beauty is marred by the uniform custom of painting the cheeks. On dress occasions beautiful and highly prized necklaces of beads and gold ornaments are worn which come from the graves of the now extinct Tairona Indians and bring to the lucky treasure-hunter a price beyond the competition of the archaeologist. For the Goajiro, living a simple aboriginal life requiring few necessities, uses his wealth only for prestige and display. His herds of stock can purchase him little but power and social standing in his community and he does not hesitate to sacrifice possessions of great value if thereby he can increase his reputation for wealth and generosity.

This condition has led to an interesting development of social custom based on wealth. All intercourse is hedged about by restrictions the violation of which may be atoned for only by the payment of heavy damages. For instance, the man who cuts or otherwise injures himself must recompense his mother's relations—to whose clan he belongs—for the offense of having shed the clan's blood, as well as all spectators for their sorrow and tears. The lender of any object by means of which any injury is suffered is liable to heavy claims, while he who mentions the name of a deceased person, even quite inadvertently, is guilty of the gravest offense, and may suffer great financial losses if he escape death at the hands of the outraged relatives. Since these payments are exacted in the form of considerable quantities of live stock, it will be deduced that the visitor to the Goajira must comport himself with the greatest circumspection if he is to return with a sound body and exchequer.

Prestige and social position, however, are as much more dependent upon



A Goajiro Indian. In every respect the contrast with the Arhuacos is striking



A Goajiro hut with its easily portable equipment. The Goajiros are a pastoral people and need to change camps frequently

birth than upon wealth as among our most aristocratic civilizations. Acquired wealth merely may permit a low-born man to marry a girl of better class, in which case his children, belonging to the clan or caste of the mother, inherit her social position. But he still remains of plebian blood, unfit for association with the aristocracy. For all descent is figured in the maternal line and, consequently, a man's sister's children are considered as more closely related to him than his own children, and to them his wealth descends, while his wife's brothers exercise considerable control over his children. The maternal uncles arrange the terms of a girl's marriage and, as she is practically sold to the prospective husband, the payment is made to them. Every man is permitted as many wives as he can purchase and support, but these, naturally, preside over different households in different camps.

Agriculture is as despised as it is difficult on the Goajira, the native living almost exclusively on meat,

together with corn and such other vegetable products as may be imported. Cattle, sheep, and goats range the peninsula in great herds, and the Goajira horses and mules are famous all along the coast. In the rainless season, all the streams are dry and the stock must be watered at great wells dug in the stream bed, an operation which consumes a large part of every day.

Needless to say, nearly every Indian is mounted. Though a good rifle and quantities of ammunition are the prized possessions of almost every man, yet the bow and arrow is in constant use and the accuracy of the natives in its use is admirable. The hunting arrows bear beautiful steel blades, but the war arrows are pointed with the poisoned tip of the ray which is always kept under a cap of hollow reed. The use of coca is unknown at present.

Since the Goajiro must follow his stock to suitable grazing, and especially watering conditions, his camps are temporary and his life nomadic. These camps consist of small houses, lean-to's



A native funeral on the Goajira. The corpse is in the hammock under the arbor, surrounded by the women mourners

and arbors made of poles and thatch, frequently open at one end, and full of a jumble of hammocks, in which all members of the family sleep, gourds, bags, and pottery vessels containing all the possessions of the family. One of the vessels is sure to contain a brew of *chicha mascada*, a large bowl of which is the first hospitality offered the visitor. He will not find this unpalatable, provided he be ignorant of the process of manufacture. This is done

by the women of the band, who chew mouthfuls of corn and expectorate the mass into a large bowl which is then mixed with water and allowed to ferment.

The greatest opportunity for display of ornament, wealth, and generosity is afforded the Goajiro on the occasion of a funeral, one of which we were fortunate enough to witness. The chief of a small band having died, the news spread rapidly through the Goa-



The burial at a Goajiro cemetery. The grave is being dug with pointed hardened sticks

jira and every native of any degree of kinship or acquaintance donned his best regalia and proceeded with his family to the camp of the deceased. Here the near relations had hung the corpse in a hammock under an arbor, rounded up all his live stock, and sent to Rio Hacha for a large supply of rum. On arrival, each man made camp and was immediately presented with meat in accord with his importance and the size of his entourage, a kid to the lesser, a goat, a lamb, a sheep, even an ox to the stars of greatest magnitude. These gifts were continued as long as the mourner cared to remain. At the funeral of one famous chief it is reported that 120 fat oxen were killed and that the hides did not pay for the rum consumed. After each newcomer had satisfied his hunger and chatted awhile with friends, he approached the corpse, threw his robe over his head and for a long time voiced his sorrow in loud and apparently sincere lamentations. His duty thus performed, he felt at leave to depart, being given meat sufficient for the return journey.

The late lamented, who had departed this life on Friday afternoon, lay in state in his hammock until Monday morning, by which time, the weather being stifling, his demise was palpable even to the most distant mourner, yet the women of the near family remained bent over the corpse, wailing continually. On Monday morning, however, he was taken down, sewed in a hide, tied on the back of a horse, and the entire gaily caparisoned cavalcade set out at a rapid pace, amid shouts and clouds of dust, for the cemetery. This was at a considerable distance, and for over an hour the procession raced across the burning sands. The thirst was unbearable and when an aban-

doned well was passed, filled with water compared with which Gunga Din's must have been the veriest ambrosia, I followed the example of several Indians in drinking a mouthful (with the natural consequence of ten feverish days in the Santa Marta Hospital). Finally the party halted at a little enclosure, and a grave was tediously dug. The slowness of this operation was caused not by the depth or size, which were slight, nor by the ground, which was not stony, but because, in accord with the inevitable conservatism of religious rites everywhere, the grave was dug with pointed sticks. This task accomplished, the corpse was finally consigned to Mother Earth together with some of his prized personal possessions. We were then warned that, the funeral and the consequent truce between hostile persons and factions being over, it was the part of discretion for non-combatants to retire, so we bade farewell to the Goajiros and their arid land. The bones of the deceased would, in accord with Goajiro custom, be exhumed in a year or two, and be given a second burial in a large urn under a pile of stones.

Thus these two nations of American Indians, though occupying adjoining regions, differ from each other in every important respect, the Arhuacos small, reticent, sedentary, and agricultural, inveterate coca-chewers, with no distinction of wealth and practically ignorant of civilized methods; the Goajiros tall, vigorous, and independent, nomadic and pastoral, with social customs and distinctions largely based on wealth, not addicted to the vice of coca-chewing, and withal good business men, apparently able to cope with the demands of modern civilization.

The Skin Colors of the Races of Mankind

By CHAS. B. DAVENPORT

Director, Department of Genetics, Carnegie Institution of Washington

AS one travels over the earth he is struck by the great variety in skin color of the different peoples, ranging from the fair, almost pigmentless, skin of the typical Swedes to the almost ebony-like blackness of the aborigines of parts of Africa and Australia. This variation in color struck the attention of early explorers. It is so obvious that it has been taken as a basis for dividing mankind into several distinct varieties, and today one of the most generally accepted classifications of mankind is based on skin color, so that we recognize the white, black, brown, yellow and red races. Our problem is: precisely what kinds of skin color may be recognized? what was the original color? how did the different types evolve?

In considering the different kinds of skin color it is first of all desirable to be able to measure it. Two main types of measuring apparatus have been used; first, a set of tinted standards, each bearing a name or number, to which any skin color can be referred. To this type belongs the well-known Broca scale consisting of patches of different colored inks printed on paper. Ridgeway's "Color Standards" (1912) give additional colors, far more numerous than are required for human skin color determination. Unfortunately, the standard colors change during the process of repeated exposures to light; also in the different printings of the scale the colors are not always the same. Another kind of standards has been devised by Professor von Luschan, consisting of 36 rectangular masses of opaque glass tinted in a graduated

series to match different skin colors, but the trouble with this scale is that the surface is too shiny to match any skin.

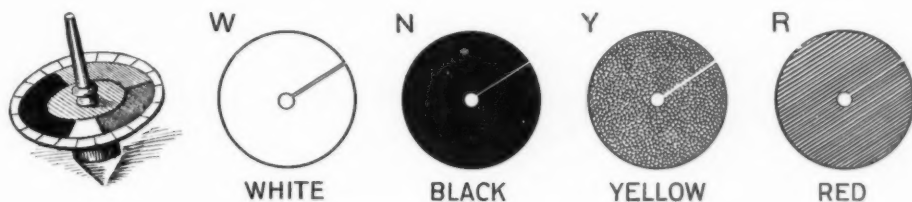
Still another method of measuring skin color does away with some of these disadvantages, while introducing new difficulties. This is the method of the color mixer or the color top. Such a top is made by the Milton Bradley Co., for use in schools. When using this top to record skin color, one must select the paper color discs according to the known color elements in the skin.

The color of the skin proper, without pigment, may be regarded as white. This is nearly the color of the skin of the cadaver, especially if viewed from the inner surface. The color is not chalky white, but more or less creamy, due to the presence of a yellow pigment. The color of the "white" skin may be reproduced by using, in the color top, discs of white and lemon yellow (pure spectrum yellow). This yellow pigment is widespread in the skin of vertebrates (as well as many invertebrates). One may identify it with Krukenberg's (1882) lipochrome, including ether-soluble fatty pigments. The amount of this yellow pigment in the skin varies in different persons and in the different races of mankind. It is most obvious in many of the peoples of Eastern Asia (whence the yellow race). It is abundant in the negro race also, but here it is largely obscured by black pigment. It shows in many mulattoes who are sometimes referred to as yellow negroes (colloquially, "yaller niggers").

The third constant color constituent of the healthy skin is a red color due to

the blood circulating in the skin capillaries. This is represented fairly by the "red" of the Bradley color top. As has been pointed out, this is not a

cant unless we know the location of the skin that was measured. It is desirable, therefore, that all skin measurements should be made at correspond-



The color top and the color discs

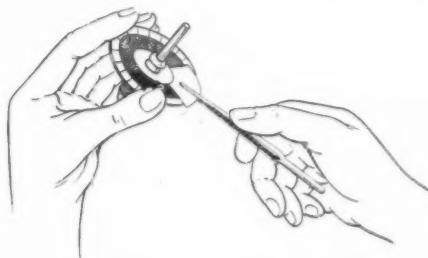
spectral red; it lies near to Ridgeway's "ox-blood red" and, according to Todd and van Gorder's determination contains 41 per cent of Ridgeway's spectral red, true j, together with 59 per cent black. Apparently, human arterial blood is not of a spectrum red color but contains much black. In using the Bradley ox-blood red we are using a color close to that of the human capillaries.

The fourth constituent of skin color is black. This is due to melanic pigment, which, when viewed under the microscope one granule at a time, is seen to be not really black but of a sepia color. In masses, however, light is so completely absorbed by it that melanic pigment appears completely black.

By combining 4 discs, white (W), black (N, *nigrum*), yellow (Y), and red (R), in sectors of varying sizes and then spinning the top, one can match any skin color closely and express the result in a formula that gives the percentage that each element, or color sector, is of the whole, e.g., N 72, R 14, W 6, Y 8.

The skin color differs on the various parts of the human body, just as it does on the body of the pig, hippopotamus, and other relatively hairless mammals. The "color of the skin" of a given person, is, therefore, not very signifi-

ing points on the surface of the body. Areas to be excluded are those that are excessively exposed to the sunlight and wind, so that they are "tanned."



Adjusting the color discs on the top

Areas thus affected change their color in the same person with the seasons. On this account face and hands are especially to be avoided. Areas that are naturally especially highly pigmented are also to be avoided. This excludes (what would naturally be excluded for other reasons) the region of the perineum, the areolæ, and the mid-ventral line of the abdomen. Areas that are naturally especially little pigmented must also be excluded. Thus the palms of the hands and the soles of the feet and, to a less marked degree, the axillary region of the upper arm are relatively devoid of pigment, even when constantly exposed. The spot on the skin to be selected should

be convenient and easily accessible and, at the same time, ordinarily not too much exposed to sunlight. The part of the upper arm, over the lower portion of the deltoid muscle, between the biceps and triceps, is recommended. This part of the arm can be placed upon a table, close to the spinning color top, to facilitate comparison.



Examples of color discs set to match skin colors of various races

With the aid of the color top it is now possible to describe in exact quantitative terms the skin color of the different races of mankind and hybrids between them, and to reproduce those colors in the laboratory. For example, three imperfect albinos of the San Blas tribe of Indians were measured by me in December, 1924. Results were as follows:

Olo, juvenile male, N O, R 37, Y 5, W 58.
Chico, juvenile male, N O, R 57, Y 7, W 36.
Marguerite, juvenile female, N O, R 62, Y 2, W 36.

It appears that in albinos the black pigment (N) is unrepresented and red (R) and white (W) are in nearly equal amount.

The amount of black pigment in the skin of Europeans varies with the amount of exposure to the sun, and with strain or race. Thus the skin of the upper arm of the writer shows a proportion of N and R which, during the earlier summer, stands at 8 and 15 respectively (total 23%), while toward the end of the summer these elements stand at 20 and 36 (total 56%).

As examples of skin color of Cauca-

sians of different racial stocks may be given the results of measuring the skin color of the upper arm of children at Letchworth Village, toward the end of the summer (August 15, 1925) when the skin was generally deeply tanned. They are as follows:

ENGLISH AND MIXED STOCK

Initials	Sex	Age, years	Skin Color			
			N	R	Y	W
W. C.	M	11	17	27	15	41
L. W.	M	11	17	33	17	33
E. B.	F	8	12	38	13	37
M. B.	F	13	13	33	17	37
R. P.	F	14	11	35	12	42
E. B.	F	17	12	22	12	54

SOUTH EUROPEAN STOCK

J. M.	F	10 Italian	25	32	18	25
S. K.	F	13 Jewish	23	27	14	36

Considering the above table it appears that in the children of English or mixed stock the boys are darker than the girls, doubtless because of greater exposure to the sun. The girls differ among themselves. Thus R. P. was distinctly of a florid type, much freckled (unfreckled skin was measured); while E. B., at 17 years, had a more pasty complexion. This difference is expressed quantitatively in the relative amount of red in the two children. The boys of South European stock are much darker than the boys of English stock—the amount of N increasing from 11-17 per cent to 23 and 25 per cent respectively while white diminishes from 33-54 to 25 and 36 per cent. A much tanned boy of about 11 years, of unknown racial stock, had the formula N 27, R 43, Y 15, W 15.

The color of the living negro skin is quite different from that of European stocks. Thus, Miss Danielson obtained in Bermuda from a probably full-blooded negress of about 30 years the following percentages: N 77, R 15, Y 3, W 5, and from a Jamaican negress the

percentages: N 60, R 29, Y 6, W 5. In Louisiana from a full-blooded negro was obtained the percentage N 70, R 28.5, Y 1, W 0.5. First generation hybrids (of known pedigree) between negroes and whites have such formulæ as 43, 27, 12, 18; 37, 32, 11, 20; and 30, 28, 18, 24. It thus appears that the mulatto has a skin color that is, on the average, intermediate between that of a negro and a Caucasian.

In the children of two mulattoes (the genetical F_2 generation), there is an extraordinary variability in skin color. Thus in one individual of the F_2 generation the skin color formula is N 10, R 30, Y 12, W 48. This person is quite white. In another case: N 56, R 31, Y 6, W 7. This person is fully as dark as many full-blooded negroes. These measurements show quantitatively that two mulatto parents may produce "white" children and full-black children; and these may even occur in the same fraternity. A prettier case of Mendelian segregation it would be hard to find. The evidence leads to the conclusion that two pairs of black-producing factors are present in full-black negroes, and only one pair in mulattoes, while the children of mulattoes may have 0, 1, 2, 3 or 4 factors for black.

Few quantitative studies have been made on the elements of skin color in Orientals. As I write, I have turned to a Japanese collaborator and have measured the skin color of his upper arm. It is N 20, R 33, Y 14, W 33. The Y element is not exceptionally great, and the proportions are not so very different from the Letchworth Village lad: L. W.

Some other observations the writer has made suggest that Eastern Chinese show a large per cent of yellow in their skins.

In some studies of the Shinnecock Indians of Long Island, I have, myself, taken a series of measurements of skin color of several of the men, who probably have no negro blood. Living largely out of doors on the edge of the ocean they acquire a very dark color. The skin color of these men is as follows:

	N	R	Y	W
C. L. B.	28	37	14	21
E. C.	37	40	10	13
D. N.	48	32	8	12

In these cases the visible yellow element is not high; probably largely because obscured by the high percentage of N+R, 65 to 80 per cent.

Of three San Blas Indians (brought by Mr. R. O. Marsh to the United States) the skin color was measured by me in December, 1924. The area measured was over the biceps of the upper arm. These people had been fully clothed for some months. The percentages are as follows:

		N	R	Y	W
Pipi	M	46	37	8	9
Philip Tomson	M	33	47	11	9
Jim Berry	M	35	44	14	7
Alfred Robinson	M	37	42	8	13
Mrs. Berry	F	31	45	13	11

Here again the high proportion of N+R (up to 83 per cent) obscures the yellow.

The skin color of a number of full-blooded Australian aborigines was measured by the author. An average reading of the women is N 64, R 23, Y 5, W 8. An average reading of the men is N 67, R 23, Y 5, W 5. It thus appears that the skin of Australian aborigines has fully as much black pigment as that of full-blooded negroes found in North America.

The skin color of a number of hybrids between Australians and whites was also measured and found to vary in the different cases, depending upon the

amount of white blood. In a typical case of a half-blood male the proportions were N 34, R 40, Y 14, W 12. A woman whose father was a half-blood with the preceding formula and whose mother was a full-blood had the proportions N 60, R 26, Y 9, W 5. This is a return from an intermediate condition of the first generation hybrid toward the full-blood condition. In the second generation of Australian-white hybrids, as in the second generation of negro-white hybrids, there is a great range and variation of the skin color. Thus in one fraternity (Mc-Hugh) the proportion of N varies from 32 to 53%.

Using the Milton Bradley colors—black, white, yellow and red—in a color top which is spun to match the skin, it appears that albinos have no black in the skin and about equal proportions of red and white, and that even in the Indian albinos the proportion of yellow (outside of the huge freckles) is small, around 5%.

In Caucasians the proportion of N varies from 5 to 25 or more, according to the racial stock and to the degree of tanning, by which process the black pigment is developed in excess. The white element is generally in excess of the red and the proportion of yellow is close to that of black. In the full-blooded negro the percentage of black rises to 60 or 70 or even more. The amount of red is correspondingly reduced and the yellow and white elements are at a minimum. In the first generation hybrids (F₁) between negroes and whites the proportion of black is about halved and yellow becomes a much more prominent element of the skin color. In the later generation the black segregates.

In eastern Asiatics and the American Indians the proportion of N

approaches that of tanned South Europeans and red is about equally abundant with black. Yellow and white are correspondingly reduced. Even in Indians the proportion of black becomes very greatly reduced when the skin has been long protected from exposure to the sun and wind, and under these circumstances the yellow element becomes very large. The eastern Asiatics were formerly classified as the yellow race—a terminology justified by the large size of the yellow factor. This factor is large, also, in Indians, although much covered over by, and possibly in part converted into, black pigment.

The skin color of Australian aborigines of Brewarrina, New South Wales, is extremely dark; in hybrids between them and whites the skin color follows the same laws as in the case of negro-white crosses.

Thus it appears that the several types of mankind differ from each other in the proportion of black and yellow pigment. The blackest pigment is found on the borders of the Indian Ocean from Australia through certain parts of India, to the whole of central Africa. Europe is characterized by a comparatively small amount of the black pigment which, however, may be much developed in certain races by exposure to the sunlight. In Eastern Asia we find certain races which on exposure to the sunlight develop a considerable amount of black but which have, also, a large amount of yellow pigment that appears when the black pigment is diluted through hybridization. This yellow pigment also seems to be present in negroes in a greater degree than in Europeans, though ordinarily covered by the black pigment.

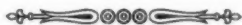
It is impossible to state definitely what was the original color of the skin

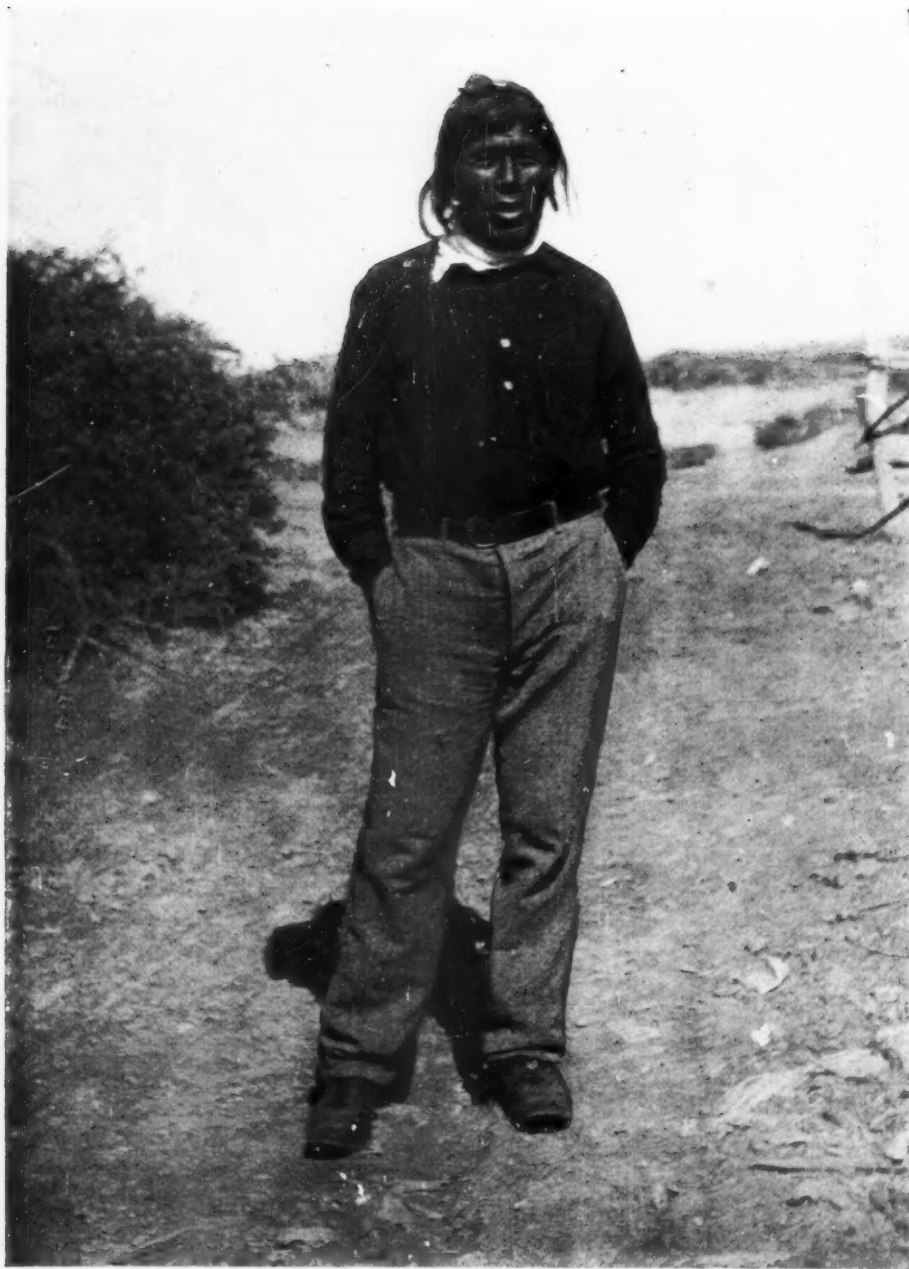
in the immediate ancestors of man. Possibly just as different species of anthropoid apes differ in skin color (the gorilla having a black skin and the chimpanzee having a light one) so a certain section of mankind may have arisen from light-skinned and another from dark-skinned ancestors. There is no theoretical reason for believing that there was a single pair to which we could point, if only we knew enough, as the progenitors of all human beings; but just as there are different kinds of gorillas today so there may well have been a variation inside the species which constituted the primitive man—a variation which had been inherited from still earlier prehuman ancestors.

If we adopt the hypothesis that the ancestor of mankind was black-skinned (and apparently a black skin was very widespread, even over Europe in prehistoric days) then the semi-albinic condition characteristic of Europeans and most of the inhabitants of Asia must have arisen through a mutation unfavorable to the production of black pigment. If, on the other hand, we assume that the ancestors of mankind had a chimpanzee-like, creamy-colored skin, then the deep pigmentation found in the negroes, negroids, and Australians must have arisen by a special mutation in the direction of melanism. There does not seem to be any satisfactory evidence that the differentiation of mankind into light and dark races was due to the direct action of the sunlight. It is true that the aborigines of Central and Southern Africa are deeply pigmented,

as are the natives of Ceylon, Papua, and Australia. On the other hand, the Southern Australians live entirely outside of the tropics, and the Tasmanians, who were very dark, lived at a latitude of 42 to 43°, about the same as that of Boston. Contrariwise, the Indians of Equatorial Brazil and Ecuador seem never to have attained the dark color of the negroes; while the Eskimo are characterized by dark pigmentation, about like that of the Equatorial Indians, but not so extreme as that of the Australians.

Melanic sports are known in many species of mammals and it seems *a priori* probable that melanism in man is of the nature of a mutation. It is clear that such mutation occurring in equatorial regions would serve to protect the underlying tissues and viscera from the effect of the powerful sun's rays. Indeed, the negro basks in the sunlight which the white man finds it necessary to avoid. The concentration of black-skinned races especially in the equatorial regions may very well be ascribed to the fact that their pigmentation permits them to enjoy just this region and tends to keep out their unpigmented enemies. The blacks who once apparently inhabited Europe were not able to hold their own there against a lighter-skinned people and were either annihilated, in whole or in part, or migrated to a climate that was grateful for them but malignant for their white enemies. This is, admittedly, speculation; but speculation based upon the best available genetical evidence.





A MOHAVE

The Mohave, Yuma, and Cocopa, three tall tribes on the lower Colorado River, were the only Californians who were notably warlike



A Western Mono woman with a carrying net, a Southern and Central Californian device

Californian Indian Types¹

By E. W. GIFFORD

Curator of the Museum of Anthropology, University of California

THERE are more families of languages spoken in California by the Indian tribes than in any other region of equal size. In habits and customs also, these Indians differ greatly among themselves. The tribes in the northwestern part of California have a mode of life reminding one of the totem-pole makers of British Columbia and Alaska; again, the tribes of southern California are much like the Indians of Arizona and New Mexico; but when one turns to central California, he notes that the native culture is unique, thus justifying the notion that central California is one of the primary aboriginal culture areas of North America.

With such variety in language and culture it is not surprising to find that California is quite as diverse in the matter of racial types. In the living Indian population of today (totalling about 16,000 souls) five types and subtypes are distinguishable. Although it

is customary to regard the American Indian race as quite homogeneous, as indeed it is when compared with the Caucasian race, we find that in California there are distinctive types in stature, and in the form of the head, face, and nose, to name only four principal characteristics.

As the Indians in the more thickly settled parts of California became extinct before anthropologists had opportunity to gather data from them, it is necessary to rely upon skeletal material to determine the physical type of the aborigines in these parts. There seems to be no clear and indisputable evidence, however, even in those regions where Indians still dwell, that the physical type has changed during the long course of the Indian occupation of California. Generally speaking, in those regions where narrow-headed people live today, crania of similar type are forthcoming; and in other

¹The illustrations in this article are all from unpublished photographs and specimens in the collection of the University of California Museum of Anthropology, excepting the diagram on p. 53 and the photographs on p. 57.



MODOC

 $\frac{1}{4}$ MODOC $\frac{3}{4}$ KLAMATH LAKE

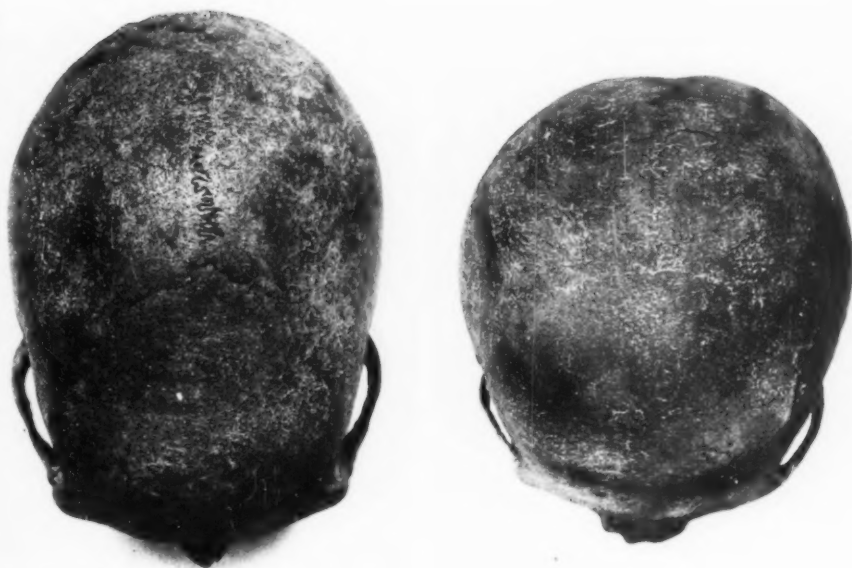
The man shows a trace of artificial flattening of the forehead, a custom practised more extensively by the tribes to the northward. The flattening is done in infancy

regions inhabited by broad-headed peoples, the cranial evidence reveals ancient peoples of the same type. This stability of population has its parallel in material culture, for the evidence of the shellmounds reveals no change in culture from the remote past down to the time of Caucasian settlement.

California has among its living tribes examples of the shortest and tallest peoples of the whole American continent. The Yuki Indians, of Mendocino County, have an average stature, for men, of 157 centimeters. The Mohave, of the Colorado River region in southeastern California, have an average stature, for men, of 171 centimeters, making a difference be-

tween the averages of more than five inches. The difference is about equivalent to that between the average statures of the Nordic and Mediterranean branches of the white race. The stature of the greater number of Californians lies between the two extremes.

The head form likewise shows a considerable range. Some groups, have narrow heads like the short Yuki, with a cephalic index averaging 76, or like the extinct Santa Catalina islanders with an average index of 74. Others like the tall Mohave have a cephalic index averaging 89, which is however due in part to deformation. It is not to be doubted, however, that the



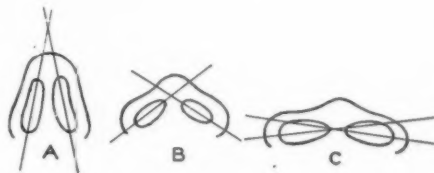
Range of head form shown by two skulls. At the left a narrow skull of the Western Mono type from Santa Catalina Island, with a cephalic index of 70.4; at the right a broad skull from the San Joaquin Valley, with a cephalic index of 90.6

Mohave are normally broad headed. Again we may compare the Californian Indians with certain of the European races in this matter of head form, the difference between the averages being comparable to the difference between the averages of the Alpine and Nordic branches of the white race in Europe.

Nose form in California also reveals a considerable range, some groups having noses which are not very much broader than those of Europeans, other groups having noses that are almost negroid in their breadth. The short-statured Yuki, already referred to, belong to the latter class, and have an average nasal index of 87. In other words, the breadth of the nose is 87 per cent of the length. At the other extreme are such peoples as the Achomawi of Shasta County and the Karok of Humboldt County with average nasal indices of 73 and 72, respectively.

One feature of narrow noses is that

the longer axis of the opening of the nostril usually runs from front to back. Very broad noses like those of many negro peoples have nostrils with the long axis running transversely. Most Californians fall into the intermediate class in this regard, having the axis of the nostrils oblique, that is to



Diagrammatic representation of nostril forms; A, antero-posterior; B, oblique; C, transverse

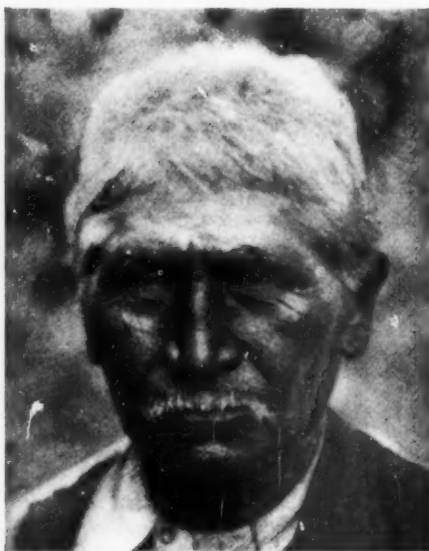
say, intermediate between the two extremes just described. The narrowest-nosed groups tend toward the anterior-posterior long axis; the broad-nosed groups toward the transverse long axis.



NARROW AND BROAD NOSE FORMS

$\frac{1}{2}$ Achomawi, $\frac{1}{2}$ Atsugewi (Shasta County),
illustrating narrow nose

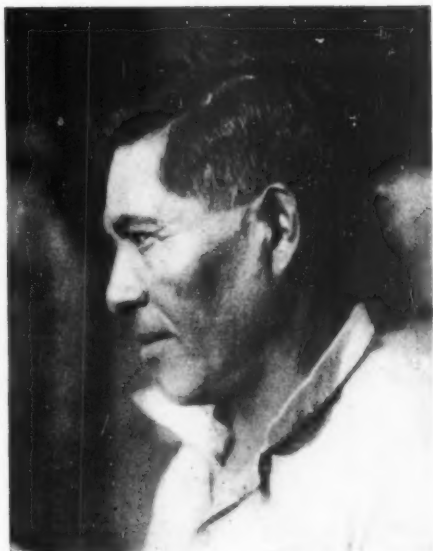
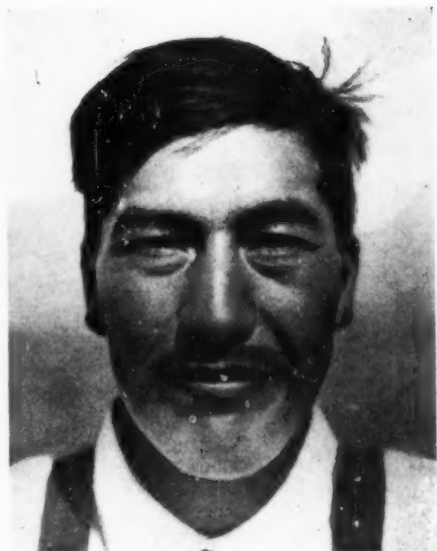
A Northern Pomo young man, illustrating
the broad nose type



NOSES APPROACHING THE EUROPEAN TYPE

$\frac{3}{4}$ Achomawi, $\frac{1}{4}$ Atsugewi (Shasta County)

A Central Miwok (Tuolumne County)



NARROW NOSES

An Atsugewi chief (Shasta County)

$\frac{1}{2}$ Achomawi, $\frac{1}{2}$ Modoc (Shasta County)



OBLIQUE NOSTRILS

A Northern Paiute girl (Modoc County)

A Southern Miwok (Madera County)



ILLUSTRATING TWO TYPES OF FACE FORM

Buena Vista type, with high face and narrow nose

San Joaquin type, with low face and broad nose

The profile of the nose in the majority of Californians may be characterized as straight, though there are a certain number of convex or aquiline noses and a certain number of concave noses. Concave noses seem to be particularly prevalent among the Yuki. The nose bridge is usually intermediate in height between that of Caucasians and Mongolians, that is to say, it is not as low as the bridges which are frequent with Mongolians, nor as high as the bridges which are frequent with Caucasians.

The glabella, the lower part of the forehead above the bridge of the nose, is frequently fairly prominent among Californian Indians, although not nearly so prominent as it is among the Australian aborigines. It is more marked though, than in average Caucasians and Mongolians. This character has its most pronounced development in males, and serves often as a means of distinguishing the skulls of adult males from those of females.

An important character that divides the Californian Indians into two dis-

tinct classes is face form. The Yuki and certain of their neighbors have low faces, as expressed by the average facial index of about 76, while the majority of the Californian tribes have high faces with an average index of about 85.

Although it is possible to distinguish the different types by stature, head form, nose form, and face form, it is not possible to separate them upon the basis of complexion, eye color, hair color, and hair texture. All are uniformly pale brown in complexion on the unexposed parts of the body. All have straight, coarse, lank, black hair. Face and body hair is scanty, as in all Mongoloid peoples. The eye color is dark brown. With exposure to the sun the Californian Indian becomes dark brown in complexion, matching some of the paler negroes in this respect. When the clothes are removed, the contrast between the dark brown face and the pale brown body is very striking.

Although the characters of the hair are among the most prominent of those

suggesting relationship to the Mongolian peoples of Asia, the complete epicanthic eyefold (so conspicuous in Chinese and Japanese) is absent in adults, so far as observations go, although there are among adults occa-

Indians are either vertical or very slightly sloped, but true low foreheads are lacking. A curious feature of hair growth frequently gives the impression of a low forehead. The feature consists of the hair growing exceptionally low



The degrees of development of the Mongoloid or epicanthic eyefold. Sometimes the degree of development varies in the two eyes of a single individual. A swollen or beveled lower lid frequently accompanies the epicanthic eyefold, but very often this occurs independently

sional instances of partial or medium epicanthus. Another Mongolian trait, that of the shovel-shaped upper incisors, is very common, however.

Chins on the whole are less prominent than Caucasian chins, though their true character is often partly concealed under a heavy pad of flesh. The lips of the Californian Indians may be characterized as medium in thickness, occupying in this respect a position halfway between the lips of whites and of negroes. In the matter of facial projection or prognathism they represent the opposite extreme to the negroes, there being practically no facial projection in aboriginal Californians.

The foreheads of the Californian

on the forehead, and quite close to the outer ends of the eyebrows.

The slight protuberance on the upper edge of the ear, known as Darwin's point, is far less prevalent among Californian Indians than among whites, in fact its occurrence may be characterized as very rare. The ear lobe is generally medium in size, though a certain number of examples have been recorded as small, and a certain number as large. Only two individuals out of several hundred examined were without ear lobes, thus approaching in this regard the characteristic condition of the Bushmen of South Africa.

The fact has been mentioned that

the Californians fall into five types and subtypes. The three main types are the Yuki type, the Western Mono type, and the Californian type, the range of which is shown on the map. The Yuki type centers in Mendocino County in north-central California,

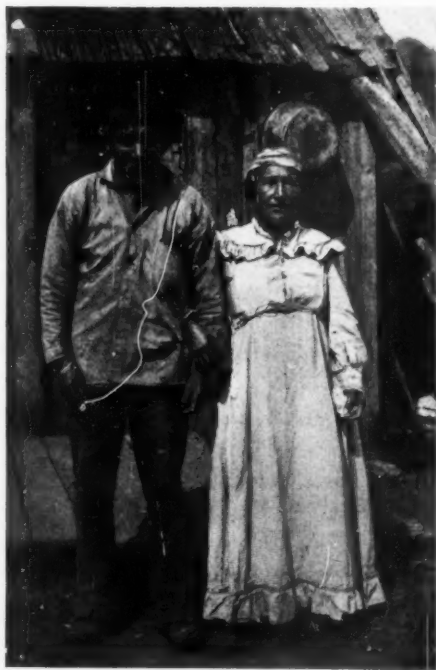


Probable distribution of California physical types

while the Western Mono type is represented by living peoples in the southern Sierra Nevada and probably by the extinct inhabitants of the Los Angeles coast and of Santa Catalina and San Clemente islands. The Californian type may be regarded as the one truly typical of the state, for in its three subtypes it occurs throughout the length and breadth of the state, except for the relatively small regions occupied by the Yuki and Western Mono types.

The Yuki type embraces not only the Yuki and their linguistic relatives, the Huchnom, but also the Athabascan Wailaki and Kato, all of Mendocino County. It is of interest to note that the Athabascan Hupa are quite different in type from their linguistic rela-

tives, the Wailaki. Here we have an excellent example of the fundamental distinctness of language and physical type. The Wailaki and Hupa tongues are but dialects of a single language, yet physically the Wailaki and Hupa peoples are very different, the short-statured, low-faced, narrow-headed, broad-nosed Wailaki contrasting with the medium-statured, high-faced, broad-headed, narrow-nosed Hupa. The Hupa are of the Californian type. This is a case in which either language or physical type would seem to have traveled, leaving the other behind; i.e. either a people of Yuki type adopted an Athabascan language from neighbors, or an Athabascan-speaking people in contact with people of Yuki type had their physical type swamped and obliterated through marriage and replacement by their Yuki-type neighbors. The case



A Hupa and his half-Hupa, half-Yurok wife (Humboldt County)



Upper Left.—An aged and blind Yuki—an excellent example of the sparseness of beard, characteristic of the Yuki type and of Californians in general (Mendocino County). He also illustrates the broad low face of the Yuki type.



Upper Right—A good example of the narrow-headed, narrow-nosed Western Mono type (Madera County)



Lower Right—A woman of half-Yuki, half-Huchnom parentage. She illustrates nicely the Yuki type with its low face and broad nose (Mendocino County)

perhaps parallels that of the Burgundians, in whom original blondness and blue eyes have been replaced through intermarriage by brunetness and brown eyes.

Apparently similar to the Wailaki case is that of the Eastern Mono who live on the east side of the Sierra Nevada in Inyo County. Although speaking a language only slightly different from that of the physically distinctive Western Mono, the Eastern Mono are unlike them in physical type and belong instead to the widespread Cali-

fornian type to which their other neighbors, the Washo and Miwok, also belong.

The Yuki type is characterized primarily by short stature (average for men 157 cm.) and low face; and secondarily by a relatively narrow head and broad nose.

The Western Mono type is medium in stature (average for men 165 cm.), high-faced, relatively narrow-headed, and medium-nosed. Although similar to the Yuki type in head form, it differs in the other characters.

The widespread Californian type is at once recognizable by its broad head and high face. The stature of men varies from medium (161 cm.) to tall (172 cm.). The nose form is variable, too, ranging from relatively narrow to relatively broad. The three subtypes distinguished are designated as Narrow-nosed, Broad-nosed, and Tall.

As to the physical relationships of the Californians to other North American Indians little can be said at present. The Yuki type suggests one of the types described by Boas from the coast of British Columbia, while the broad-headed Californian type seems to resemble the broad-headed type of the Northwest, as represented by the Kwakiutl and the Shuswap. In the south, the Californian type appears to have relatives in Mexico. Hrdlicka writes:

† Ancient crania from the California Peninsula are also of a different type. Arizona and Sonora show no population, recent or ancient, allied physically to the Californians. In

Mexico, however, are several great Indian peoples who in many features approach the Californians to such a degree that an original identity must be held as probable. One of these is the Otomi, of the States of Hidalgo and Mexico. A large group of peoples in the States of Puebla, Michoacan, and farther south, even including the Aztecs, and finally the Tarahumare, in Chihuahua, are all physically related to the Otomi as well as to the Californians.¹

It seems clear then that two of the three outstanding Californian types are not peculiar to the state. The third type, the Western Mono type, will probably be found to have relatives elsewhere also.²

¹ALES HRDLICKA, Contribution to the Physical Anthropology of California, *Univ. Calif. Publ. Am. Arch. Ethn.*, IV, 64, 1906.

²The principal published works on the physical anthropology of the Indians of California are as follows:

FRANZ BOAS, "Anthropometrical Observations on the Mission Indians of Southern California," *Proceedings of the American Association for the Advancement of Science*, Vol. XLIV, pp. 261-69, 1895. "Anthropometry of Central California," *Bulletin of the American Museum of Natural History*, Vol. XVII, pp. 347-80, 1905.

ALES HRDLICKA, "Contribution to the Physical Anthropology of California," *Univ. Calif. Publ. Am. Arch. Ethn.*, Vol. IV, pp. 49-64, 1906.

HEINRICH MATIEGKA, "Ueber Schädel und Skelette von Santa Rosa (Santa Barbara-Archipel bei Californien)," *Sitzungsberichte der Königlichen Böhmisches Gesellschaft der Wissenschaften in Prag*, 1904.



A.—A Washo of the vicinity of Lake Tahoe, a good example of narrow-nosed variety of the California type.

B.— $\frac{1}{4}$ Western Mono, $\frac{3}{4}$ Gashowu Yokuts (Fresno County).

C.— $\frac{1}{4}$ Western Mono, $\frac{3}{4}$ Gashowu Yokuts (Fresno County). Shows tanning from sun quite markedly.

D.— $\frac{1}{2}$ Eastern Mono, $\frac{1}{2}$ Miwok, an unusually broad-faced individual

Descendants of the Maya Indians

FAMOUS FOR THEIR ARCHITECTURAL ACHIEVEMENT

PHOTOGRAPHS REPRODUCED THROUGH THE COURTESY OF THE CARNEGIE INSTITUTION OF WASHINGTON
AND E. L. CRANDALL



A SUNNY LITTLE MAYA MAID

The children of Yucatan are happy and cheerful. Their playthings are simple and their wants few. The days slip by in playing out-of-doors, bathed in the brilliant sunshine of the subtropics, health-, strength-, and life-giving. This little miss of eight or ten will mother a whole brood of younger sisters and brothers, taking care of them all day long, piloting them carefully through the village streets, and marshaling them home again, safe and sound, at eventide



TEMPLE OF THE FOUR LINTELS AT OLD CHICHEN ITZÁ

A Mestizo boy standing beside the western doorway of the Temple of the Four Lintels at Old Chichen Itzá. This is a typical Maya ruin, standing roofless and dismantled, buried in the dense tropical forest



A PRIMITIVE SUGAR PRESS
Stalks of sugar cane going through a primitive sugar mill. The juice is made into sugar for local consumption and home-brew



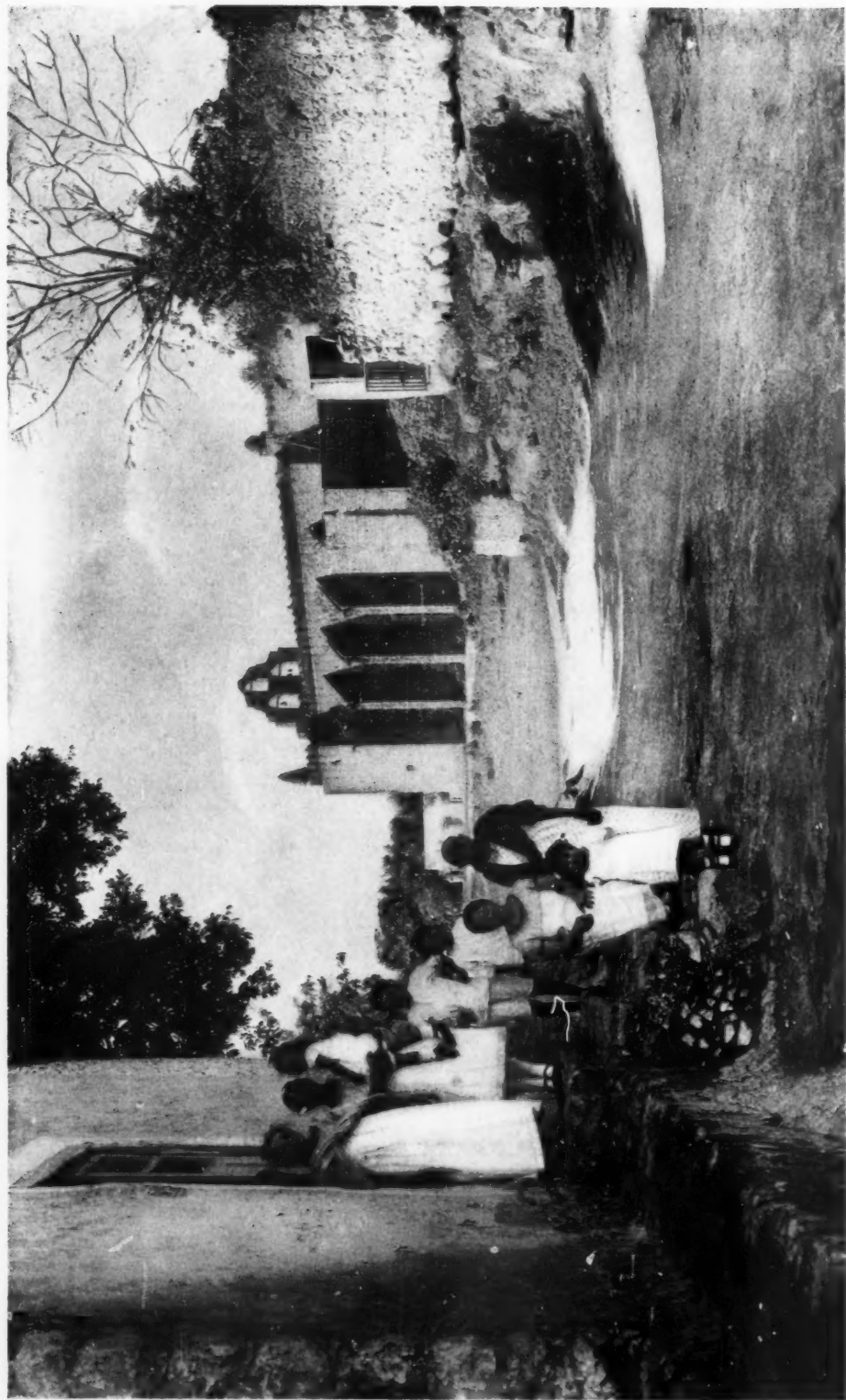
YUCATAN TODAY AND YESTERDAY

A Mestiza standing by one of the Plumed Serpent columns in the Temple of the Jaguars at Chichen Itzá, Yucatan



INDIAN GIRL IN THE TEMPLE OF THE JAGUARS

Both Indian and Mestiza girls wear the same kind of garment—the embroidered huipil, and their costume is considered incomplete without the gold filigree chain and cross



THE CHURCH AT THE VILLAGE OF DZITAS

Every village in Yucatan has its church of stone, often of enormous size. The church at Dzitas faces the village plaza and has a picturesque belfry, a machicolated roof, and flanking buttresses. It serves the religious needs of about two thousand people. The group in the left foreground includes both Indians and Mestizos



STREET IN A YUCATECAN VILLAGE

The streets in the villages of Yucatan are rocky and rough, great patches of native limestone cropping out everywhere and anywhere. Dry-laid rough stone walls line these simple highways, and the houses of stone or plaster-covered wattlework are built flush with the street line



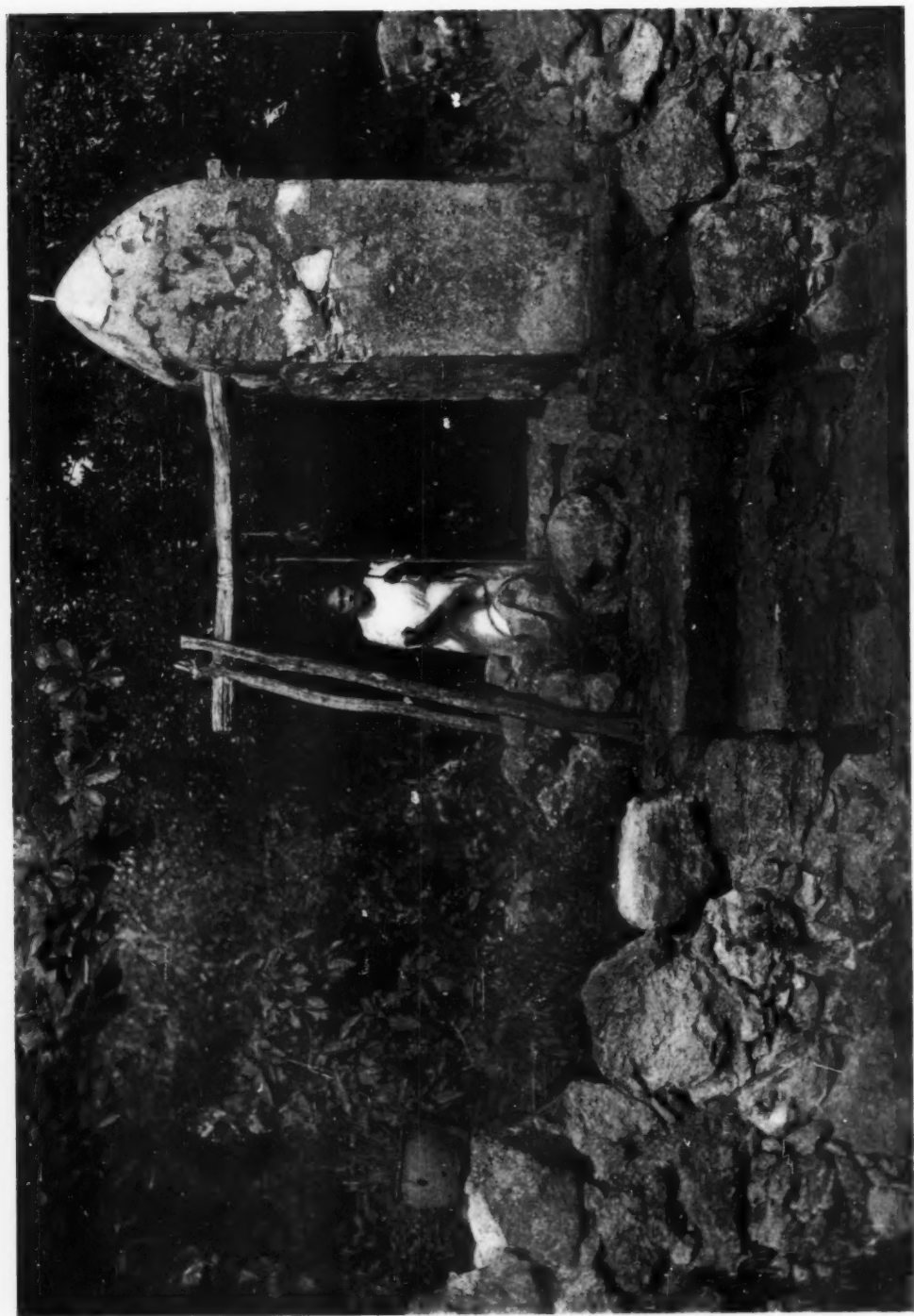
CHANGING CUSTOMS AND COSTUMES

The picturesque huipil of the Yucatecan women is gradually being replaced by cheap European clothing in the younger generation. Girls wearing modern dresses like the one in this picture are called Catarinas to distinguish them from the Mestizas or Indians who wear the old-fashioned huipiles



A SHRINE BY THE ROADSIDE

Roadside shrines with wooden crosses are found throughout Yucatan. The devout, in passing, offer a candle, a bunch of flowers, a bit of colored ribbon or paper, and a prayer



A YUCATECAN REBEKAH

The water-carriers of Yucatan are the women and girls. Almost no houses outside of Merida, the capital, are equipped with running water, its source being wells in which the country abounds, and its service of supply—the Yucatecan women



MESTIZA GIRLS DRAWING WATER

Yucatan is a dry limestone plain with practically no surface water. Every village has one or more wells, and here all day long the women gather to gossip and fill their large earthenware jars, hauling the water up by hand



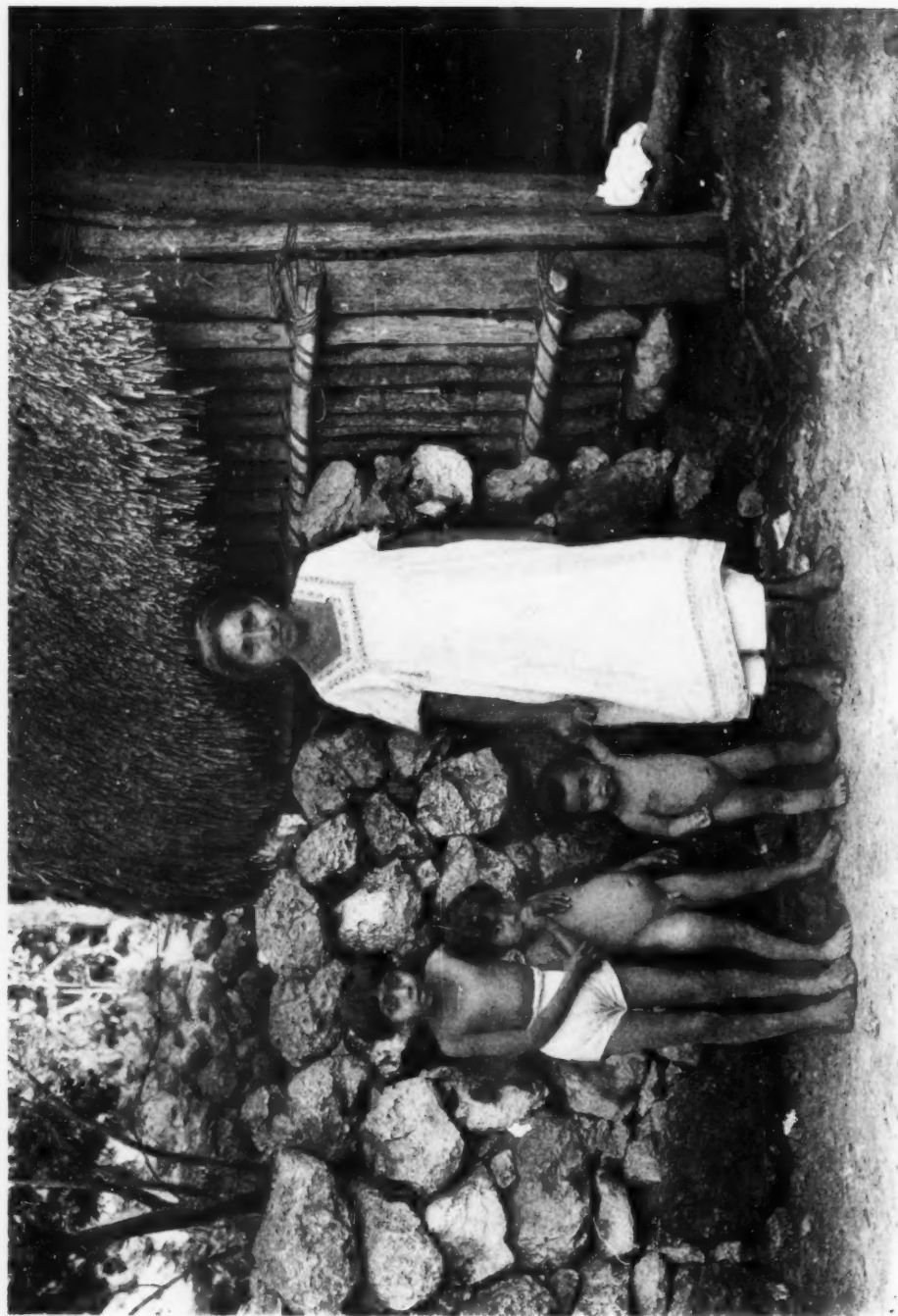
A MAYA INDIAN GIRL

A Maya girl in her embroidered huipil, standing in one of the winding stony roads of a Yucatecan village, with its rough-laid stone walls



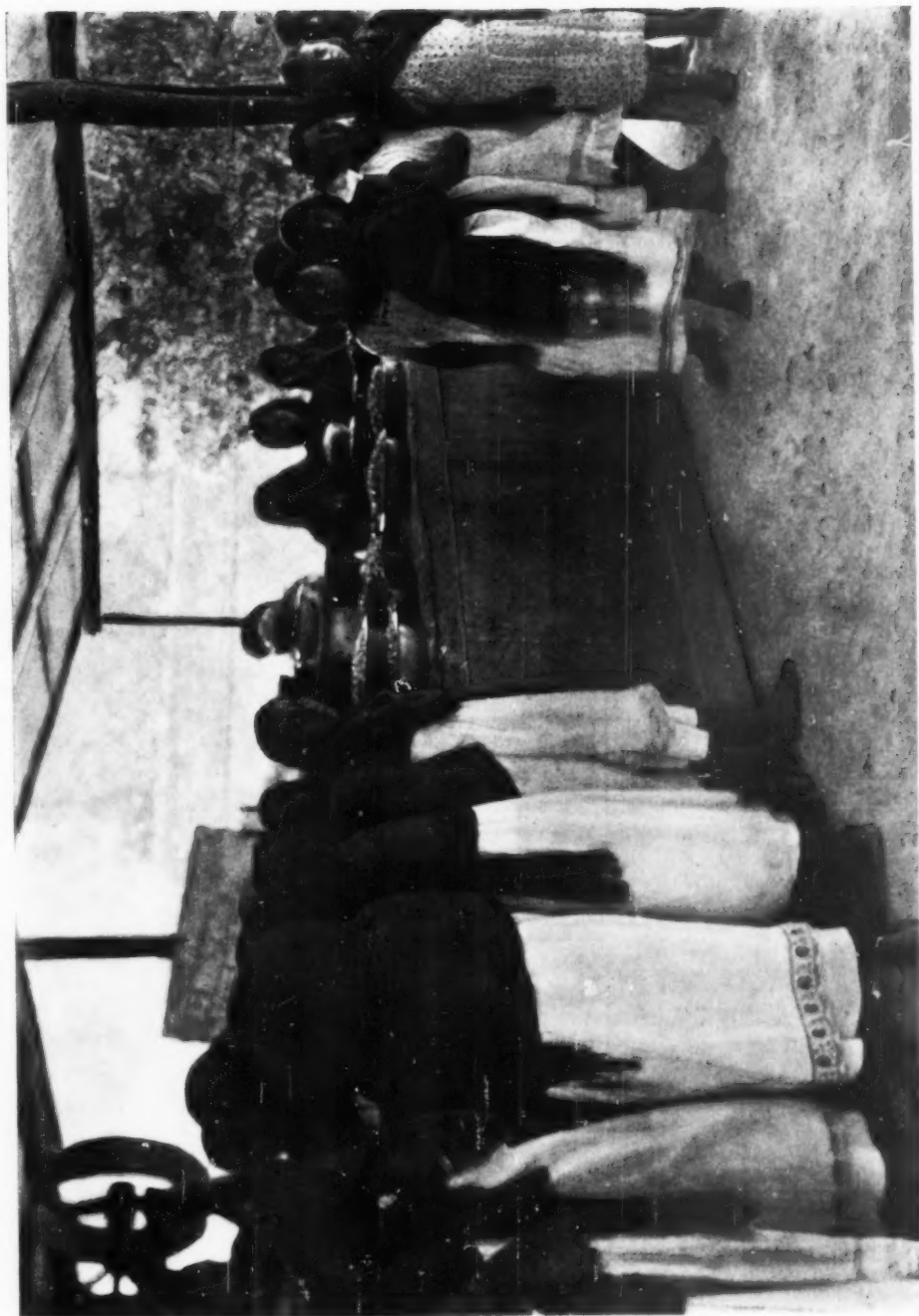
A MESTIZA GIRL

This girl is wearing the typical women's garment of Yucatan, a white cotton single-piece sleeveless slip embroidered around the neck and the bottom of the skirt with flowers in cross-stitch



TYPICAL YUCATECAN HOUSE

A thatched wattlework hut with rounded ends, and front and back doorways, is the typical home of the Maya Indian family, the same today as it was a thousand years ago



THE VILLAGE MARKET

Small booths where local produce is sold in diminutive quantities, a *medio* (3 cents) of sugar, a *cuartillo* (1½ cents) of coffee, are features of every village market



A ROADSIDE WELL

In the parched and waterless landscape of Yucatan the traveler hails with delight the wayside well, the vivid green leaves of the banana tree arching over it offering a grateful island of shade along the sun-baked and dusty road.

Modern galvanized iron buckets and even five-gallon gasoline cans have replaced the old wooden containers at these wayside wells, somewhat destroying their picturesqueness, but the water still remains the same—cool and refreshing as of old



Tsibish decided to turn away from the lake trail, because it was so cold

An Incident in Montagnais Winter Life

PRIMITIVE MAN'S SHELTER

By FRANK G. SPECK

Professor of Anthropology, University of Pennsylvania

I CAN review in my mind's eye the scene of our departure some years ago from the comfortable settlement at Lake St. John, near the southern base of the Labrador Peninsula, where the Montagnais hunters come in the summer months to secure the necessities of life in exchange for their furs. My companion was a seasoned nomad named Tsibish, who drives two big sled-dogs, Blacky and Broken-leg. The scenic setting and the details of our experience rise in the form of a quiet panorama of the semi-arctic. It is as vivid as the immediate present.

We have turned our backs upon the low buildings of the Hudson's Bay Post nestling upon the shore now banked

high with snow reaching to the eaves on the side toward the lake. Tsibish has decided to push his way through the small timber and take a land route to reach a point convenient for his purpose, rather than to follow the shore and avail himself of the smooth going over the lake, because the latter is so much colder. For the intense cold lies like a pall over these frozen bodies of water. After rising some thirty or forty feet in passing through the fields and clearings about the Post we welcome the more comfortable temperature, despite a slight increase in the breeze, and the sight of the sun, though it is dimmed from its usual winter brightness by a drive of sifting snow.

Our course leads toward the northwest following the usual dog-trail, broken and beaten by the sled runners and the feet of several parties which have passed this way since the last heavy snowfall. Not content with the



A breathing spell

easy passage of the beaten trail, the perverse dogs hardly run fifty feet without floundering in the soft snow at one side, and with great fuss are pulled back to the track. Bad behavior we say, but evidently good normal sled-dog progress. A snag has caught the trace.

"Back up! Pull off your mittens, Tsibish. Hold them in your teeth to choke your grumbling. Untwist the traces and start again."

No order to the going, all snags, branches, soft powdery places, but still the Montagnais finds occasion to grin, for to his well-adapted arctic humor there is something funny in the gawky postures of the dogs, their sheepish,

helpless looks, and especially in the fact that the whole foolish performance will have to be repeated in all probability by the time we have covered the next fifty yards.

Ekwes'à! Kakwshtëoshet, "Now then! Blacky."

And so progress is slow, but before long the dark line of the evergreen forest looms nearer. That is what we want, for not far within the embrace of its thickset, closely-grown, snow-laden branches we are going to make our bed, as open to the stars this cold night as the bed of the wolf. And we are going to try what to the Montagnais and Naskapi of this barren plateau is the very culmination of severity; a night in the *ktabakwènd-zwap* "open-top camp." To many a starving hunter in the Labrador *taiga* this term connotes not only the misery of cold, but the pangs of hunger, since it is most often that the open-top camp becomes the night's bivouac when the game has failed. And then the able-bodied men as a last resort launch themselves abroad without the usual camp impediments in a final endeavor to find food. In this case, however, such an extremity does not have to be considered, because tucked away in the fur bags tightly strapped on our sled are a frozen northern hare, a quarter of beaver, some frozen moose-meat, a fat beaver tail, about half a pound of tea, and some little cotton sacks of sugar and salt, providing altogether a source of mental satisfaction that again brings the friendly grin to Tsibish's broad face.

Our little run of a couple of hours on the open stretch has brought out the perspiration on our bodies, so we open our fur coats and push back our warm caps from steaming brows, to look about, now that we are within the

silent balsams. No wind in here. And I can see by the focus of my companion's eyes that his glance is ranging both sides of the track for the proper place, one sheltered by living evergreens but within reach of enough standing dead trees to supply the eight or ten logs which we are going to burn in the course of the long January night. The place is found. We plunge from the path into snow almost hip deep and pass a couple of rods to the right with the dogs in still worse plight, wallowing with their sleds in a spray of dry snow. Everything comes to a stop and out comes the light steel bush-ax which every Labrador Indian keeps within reach while on the trail. A tender touch to its keen edge, a glance from it to a small balsam,—whack, and Tsibish's work is begun. Blacky and Broken-leg are lying just where they stopped and are guzzling in the snow as though they had never seen it before. This is their habit, for the Montagnais teaches his dogs to nose into the snow at a signal to smell for beaver, when he is hunting near a lake, until nosing the snow becomes habitual with them.

Tsibish has dropped the tops of three or four balsams now, slanting down to the snow, by cutting them only partly through on the same side.

This is to be the wind-screen of our night's shelter. Lopping off some branches, he intertwines them vertically, forming a fence about four feet high above the snow and ten feet long. It has a sufficient curve to make almost a quarter circle. By this time we have tramped down the snow within the

are, and a little packing of more snow around the sides is sufficient to keep out the direct wind and the flank drafts. The litter of twigs and small branches resulting from our operations is now gathered and laid about a foot deep under our feet for a flooring. And behold the "open-top camp" for a winter night in the Labradorean plateau is ready for occupancy by the hardy Montagnais hunter and his white comrade.

On a stick near the back of the enclosure, the frozen hare is impaled, while still one more serious task has to be performed. With a glance at the gathering dusk of the afternoon twilight, Tsibish sinks the keen blade of his ax into the nearest dead balsam tree. And the veteran of many winter blasts and summer droughts, killed by the consuming tongue of flame of a



Guzzling in the snow

bush fire some ten or twelve years ago, now falls prostrate in the soft snow. In a few minutes six or seven others follow and we are soon dragging ten- or twelve-foot lengths of the doughty spars to the front of our shelter.

It is now too dark to wield the ax in safety, so the fire is started with dry

cedar twigs in the hands of the leader, lighted by a match, the "little fires" which have now become so indispensable to these Indians who, only a generation ago, had to rely on flint and steel. The cheerful flames leap into being,



The "open-top" camp. (Negative exposed 1 hour, 30 minutes at midnight)

spread, and eat their way upward into fresh bundles of faggots and downward into the sizzling snow. They catch into the dry surface of the trees hauled from the *brulè*, and by the time complete darkness has engulfed our white-floored cañon amid the evergreens, there is warmth enough and light enough to illuminate a scene which would strike the fancy of the most apathetic beholder. The Labrador hunters of today, reduced to the straits of elementary human existence, construct their open winter bivouac in a form reminiscent of some remote period of culture before man had taught himself the device of complete overhead shelter. We can see our-

selves reproducing now the experience of boreal hunters in early Neolithic times, and the thrill of the experience, even though it be for only a passing glimpse backward into those hoary ages, is the reward. We are living for a while in a primeval atmosphere. These thoughts, however, are passing through the mind of only the white man. A look or two at Tsibish betrays the fact that to him this is part of life. For I learned that he and his companions have resorted winter after winter to this procedure when, through the necessity of seeking new hunting districts, they betake themselves with minimum of food, axes, and weapons, to distant barrens, in the hope of locating a fresh abundance of meat. *Mishte alimàn!* "great hardship," as they term starvation, is the normal lot of Tsibish and his kind during the long hard winters of the interior. Not only he but his wife and children know it, and generations of ancestors as well. More than half of them have fallen victims, and almost half still do succumb to that fate.

Back to the immediate present my thoughts leap with the bounding flames of the now furnace-like cavern eating their way through the forest snow downward to the forest floor. We kneel on the boughs of our enclosure and empty the caribou-skin sack of its frozen contents to prepare our evening meal. Out come the viands. Portions of meat hewn off with the ax are affixed to green twigs and inclined toward the heat to thaw and roast. On a piece of rag stretched on the boughs, is poured a handful of tea. This goes into the kettle and on top of it several handfuls of snow from the dirty but willing hands of "Little-Tea-Water," for this, I am now ready to announce, is the meaning of my

companion's native name. Tsibish is, indeed, "king of the tea," and he smiles at the flavor of his joke as a few minutes later the odor of his brew fills his nostrils. The same tawny hands are now wiped free of grease in his thick hair.

The labor of the day is finished. The genial warmth in front of us thaws out tongue as well as face, and the tradition of taciturnity with which the northern Indian is accredited is everlastingly shattered by the flow of conversation and exchange of jokes lasting through most of the night. Food consumed, washed down with several pints of tea, blankets out, dogs fed and snuggled down on their crisp couches of snow while still attached to their harness, and we are ready for the night.

My own thoughts now turn to the Eskimo this cold night, sheltered beneath the thick roofs of their snow-huts some hundreds of miles to the north and east of us. The full force of the contrast between their almost comfortable existence and the Indians' comfortless one is borne out in reality, viewed from the debit side. Even though we are enclosed in hareskin robes over our fur and woolen garments, the biting cold descends from the altitudes above and is drawn with violent suction against our backs and sides by the volume of heat ascending from the cavern of embers. It is no paradox to declare that it is colder near the fire than it is at a distance of fifty feet. It is this violent draft of in-drawn cold that makes the bough-screen at our backs an absolute necessity. No



As the afternoon darkens, the smoke rises, and our *Ktabakswèndzwap*, "talsam camp," beside the trail is complete

matter how cold the night is without, its all the same! To add to it Tsibish says in his low voice, "*Kispashnanò*," "Let's melt some snow for a drink." Several quarts of crisp snow are forthwith heaped into our kettle for drinking-water and for the tea-drinking which will amount to dissipation this long night. Tsibish wishes it would snow hard during the night to raise a drift against the rear screen, the better to turn the wind. Wind is deadly! It cuts through every covering but leather. Hence, our feet enveloped in moccasins over five pairs of woolen socks, and our hands in caribou-skin mittens over woolen gauntlets beneath, are now our most comfortable parts. And where, in this congealing night, are the pair of cross-bills and the Hudsonian chickadee, the only birds seen during the day's march? And how does the tiny body of the Labrador red squirrel that alarmed us with his rattling call this afternoon withstand the intensity of this polar chill?

"I am satisfied to be in here now where it is calm," remarks Tsibish, "for indeed on the lake now it is blowing hard."

Need I say that our conversation soon turns to that topic of eternal interest—the comparison of racial values? He is as eager to know the habits of my people, the *Bastonèuts*, "Bostonians," as the Labrador Indians call all Americans, as I have been, throughout our twelve years of friendship, to comprehend the life of the *Inuits*, "The people," as these Indians call themselves. And I tell him as he listens with rapt attention. Many grins and some surprise, show in his wide eyes as I unravel the mysteries of home-life, domestic appliances, and social relationships of the *Otcimàwuts*, "Gentlemen-Chiefs," by which name

these simple natives also designate the occasional Americans whom they encounter on their sojourns to the post. But let us turn from this portion of our dialogue to that which concerns the lore of the savage.

"*Opitcipwiàn Otcimàù*," "Gentleman-Chief-of-the-Rags," (for such is my honorable title among these people,—one derived from the habit of buying their cast-off objects), "this night is one like that during which *Atikwabèo* "Caribou Man," had his dream which called him to leave the company of mankind and become chief of the caribou. Maybe you know the story how he, with the men of his family, were on the tracks of the herd. How they left their families with all the food to save them and set forth, with nothing to eat themselves, in search of relief. How they were hoping for a dream to tell them where to go to find the caribou. How after several nights in the open-top camp, just as we are tonight, they received no dream at all and began really to starve. How on this night Caribou Man received a vision. How he saw a female caribou appear and call him forth to join her companions, to go with her as a mate and become the chief of the caribou. And how he told his dream to his father that night when they awoke to throw more wood on the fire as we shall soon do. Ha! ha! And then sure enough when morning came did it not come true? The caribou were there and a female came forth. And did he not lay down his weapons in the snow and walk to where the female caribou was standing? And did he not disappear with her and carry out her wish? And at last did he not send his relatives some big bulls for them to kill and thus save them and their little ones from the great starvation? Ah! It was a night like this

that he left them for their sake and still lives with the caribou herd, riding the back of a bull when they travel, and sleeping among their bodies for warmth, these many winters. They say he eats moss like his caribou and even that he has had offspring by them. You know that story, Gentleman-Chief.

"I have indeed often wished, for the contentment of my soul-spirit, to journey to those mountains somewhere far north of the land of the Barren Ground People to see from a safe distance the Caribou-House where Caribou-Man dwells, that is so often spoken of. Ah! to behold such a mountain of caribou-hair and to see the great caribou-herds that gather within it at the summons of Caribou-Man. Even the *Ayestcimèuts*, 'the Raw-Meat-eaters,' the 'Bad People' (Labrador Eskimo), know that the caribou are sent forth from there by Caribou-Man for us to kill.

"But we shall never see that region, *Otcimàù*, for I know that neither you nor I could journey so far, and you, like us Indians, would not disregard the tradition which forbids us to approach it.

"At any rate let us take another drink of tea and rub grease on our foreheads that we may fall asleep for a while before the fire needs wood again, and dream of the great food."

"Yes," I solemnly reply, "I know the story, my comrade, and I doubt whether I shall ever try to reach that

land, as I know that no one who reaches it ever returns again. We will try to sleep for a while to learn what our souls will tell us in the 'great dream,' for the drink of tea and the grease rubbing we have given them."

Tsibish takes out his moose-skin tobacco pouch and fills his pipe, "to give his soul-spirit a drink of smoke," as is the custom of these nomads. The fire getting low, we drag three more great logs on the embers and settle down in our "sets" beneath the arctic sky. As the frigid scene dancing through the leaping flames grows hazy and finally melts into blackness, I lose myself in drowsiness. I do not know what Tsibish did, nor can I recall now if I dreamed that night. I only recall that, for the fourteen hours or more we occupied our position, there were awakenings, tea-drinkings, and some narrations, more than a dozen times to replenish the gigantic fire and turn our cold parts toward its heat. And at last the gray of dawn and the shine of the cold moon brought us to the consciousness of coming day. With the dogs kicked out of their snowy beds and a good meal on the remaining beaver and hare meat, we soon left the "open-top camp," that memorable relic of winter life, and continued our journey northwestward through the endless balsams along the narrow sled trail that led to Tsibish's solitary tent miles away, where his wife and six children were anxiously waiting for him.

Some Changes in the Human Face as Influenced by the Teeth

By MILO HELLMAN

Research Associate in Physical Anthropology

THERE are few parts in the make-up of the individual that portray so well the effect of development¹ as does the face. From the beginning to the end of life, the face undergoes a continuous series of changes. The gradations of these changes are, to be sure, imperceptible, and definite border lines do not exist; but certain stages, once reached, become well defined and are easily recognized. For example, anyone is able to notice the change of the infant face to that of the pubescent boy or girl, or to that of the adolescent man or woman. The transition from middle life to senility is also easily recognized by the facial change.

While such changes are obvious, some of the factors concerned in bringing them about are not so widely known. It is, for instance, not generally known how much the teeth contribute to the modification of the face. As a matter of fact, on account of their position in the jaws, the teeth constitute an important factor in this process. This becomes quite evident when it is shown that certain stages in the development of the dentition are coincident with and perhaps causally related to certain changes of the face.

It must be stated that these stages in development are not necessarily related to age, but rather to certain conditions, since a certain stage in development may be reached by one individual much earlier in life than by another. As a consequence, the age at which a

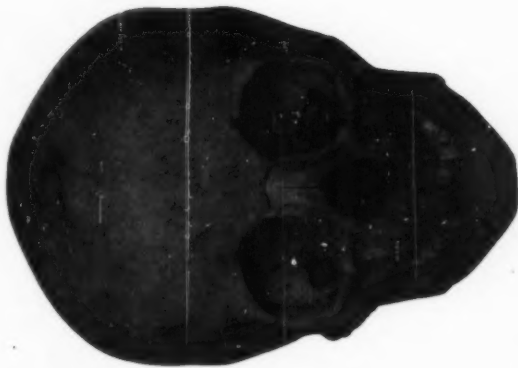
stage in development is reached varies when a number of individuals are concerned, but the stage attained is, nevertheless, the same in all. For example, all children in the course of development go through the stage of puberty, before they become adults, but some go through it earlier, others later. This depends on hereditary tendencies, on environmental influences, and on many other known and unknown conditions.

In the development of the dentition too, certain easily recognizable stages are reached, but the age at which these stages are reached is variable. Studies of a large number of New York children illustrate this point quite clearly. For instance, it is found that the stage of the fully developed deciduous dentition in these children may persist until the seventh year. But the succeeding stage, when the first permanent molar tooth has been added to the deciduous dentition, may be observed between the ages of seven and eleven years. Coincident with the eruption of the first permanent molar tooth in these children, one or all of the deciduous incisor teeth may be lost and replaced by their permanent successors. The stage following, when all the deciduous teeth have been replaced by the permanent successors, extends from nine to fourteen years of age, and the establishment of the permanent dentition, less the wisdom teeth, occurs from eleven to seventeen years of age. The variability in age is thus quite evident. But the whole matter becomes more

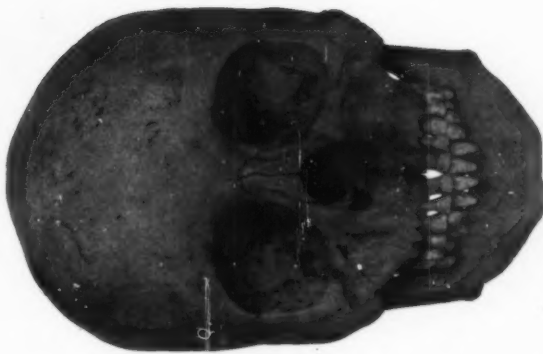
¹Development is used here in the sense of embodying both growth (increase in size) and differentiation (increase in complexity).



1

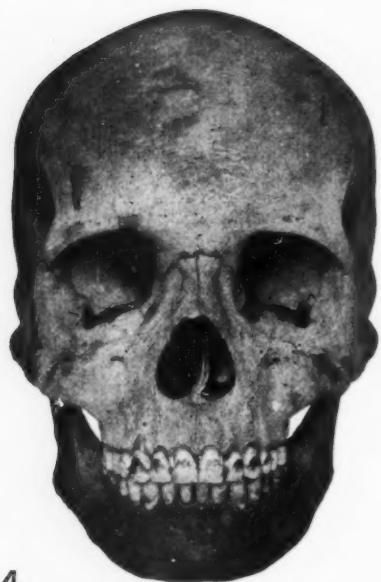


2



3

1. Infancy:—The deciduous dentition is not fully developed. The incisors are completely erupted and in position; the first molars are not quite fully erupted, while the canines are just beginning to erupt. The second deciduous molars are absent as yet.
2. Early childhood:—The deciduous dentition is fully developed. The upper lateral incisors and canines were lost in transportation.
3. Late childhood:—The first permanent molars have erupted and are in position. The lower deciduous incisors have been lost and are replaced by the permanent incisors. The upper deciduous teeth are still all present



4



5



6



7

4. About puberty.—The permanent dentition is fully developed. The third molars (wisdom teeth) are still absent.

5. Adult.—The permanent dentition is completely developed, including the third molars (wisdom teeth).

6. Old age.—The permanent dentition is still complete. The teeth show extensive wear. The lower right second premolar was lost in handling.

7. Senility.—Most of the teeth have been lost; those remaining show much wear. The alveolar process is considerably atrophied

complicated when groups of children of different economic levels or when the sexual differences in the same group are studied. It is therefore simpler and more satisfactory, when development is discussed, to refer to the stages and not to the ages. The stages of dentition to be discussed in this paper are the following:

1. When the deciduous or temporary teeth are in the process of eruption.
2. When the deciduous dentition has been completed.
3. When the first permanent molars have been added and some or all of the deciduous incisor teeth are lost and are being replaced by the permanent incisor teeth.
4. When the permanent dentition—less the wisdom teeth—is completed.
5. When the wisdom teeth are in position.
6. When the teeth show extensive wear from use in old age.
7. When the teeth are lost during senility.

These stages, numbered from 1 to 7, give an adequate illustration of the development of the dentition.

That the growth of the face is, in a large measure, influenced by the development of the dentition, can be demonstrated by certain measurements. The height of the face, for instance, is determined by measurements taken between the point where the bones forming the bridge of the nose are joined to the lower border of the bone constituting the forehead and the middle of the lower border of the lower jaw. This dimension is called the total height of the face.¹ In the infant, before the teeth have appeared, and in the senile, after they have been

lost, this measurement indicates the dimension of the bony structure of the face alone, for the jaws in these instances are in contact with each other. But when the teeth begin to erupt in the toothless infant's mouth, the jaws are pushed apart, as it were, by the teeth, because additional room is necessary for their accommodation. As a result, there is an increase in the height of the face to the extent of the area occupied by the teeth, in addition to the actual growth of the jaw bones themselves. The teeth thus form a separate and distinct item in the increase in height of the face.

The fact then becomes quite obvious that the changes in height of the face are due to two processes occurring simultaneously. One, of the growth of the jaw bones, and the other, the development of the dentition. Their relation can be determined by a comparison of relative measurements.

Of course, the proper and ideal way of obtaining such measurements would be to follow up one or many individuals by repeatedly measuring their faces, from early infancy to senility. (This is being done and will be reported when the records are more complete.) It will, however, take a long time before it can be done satisfactorily. Another method is to take a group of individuals of all ages and make comparative measurements. This also has been done, but measuring the living is more or less subject to inaccuracies because of various difficulties. For instance, the skin and the subcutaneous tissue (the meshwork of various tissue fibers, the fat, and the delicate muscles under the skin) are sources of a considerable degree of error. It is therefore easier and more satisfactory to measure skulls. Furthermore, when skulls are

¹Attention is called to the fact that the growth of the face occurs in three dimensions, in height, in width, and in depth. For the present purpose, the discussion is confined to the height alone.

measured, a more desirable group can be chosen to make the procedure more effective.

A collection of skulls recently acquired by the American Museum of Natural History has been found eminently suitable for this purpose. This collection consists of a large number of American Indian skulls excavated by Earl H. Morris in Cañon del Muerto, Arizona. They date back an extensive period in time, certainly more than two thousand years, and appear to have belonged to a very homogeneous group, as shown by the various characters studied. The collection also recommends itself for this purpose, because there is a remarkable range of ages from infancy to senility; also their dentitions are far superior to and more uniform than the dentitions of modern civilized people.¹

The measurements of the faces of these skulls revealed a very interesting fact. They show not only that the face grows in the course of development, but also that when it grows, it follows certain characteristics inherent to all growth phenomena; i.e., its growth varies in intensity at different stages of development. It grows, for instance, more rapidly at first, slows down, and then speeds up again. But while it continues to grow until old age, the rate of growth becomes slower and slower as age advances. The greatest amount of growth takes place during adolescence. In senility, there is a reversal of this process, a kind of involution, since the height of the face is actually reduced. A glance at the figures in the first column of the accompanying table (p. 73) will convey a

better idea of what actually happens. These figures are based on the arithmetic averages for the measurements.) The periods of facial growth are approximated by the stages in dental development. The second column gives the percentile increase of the facial height at the stages mentioned.

Referring to the dental development, it is quite clear that the first marked increase in facial height is coincident with the completion of the deciduous dentition; the second, and the most significant one, during the completion of the permanent dentition. The first slowing up in growth occurs during the period preceding the loss of the deciduous teeth, and the second, after the completion of the permanent dentition. But while the first retardation is temporary, the second retardation continues until old age sets in, terminating with an involution of the facial skeleton, when there is an actual decrease in height. This, as has been mentioned above, is coincident with the loss of the permanent teeth.

With this point in mind, the measurements of the dentition also assume an interesting aspect. As has been mentioned above, the teeth form a distinct item in the dimension of the facial height, for the dental height¹ is not the same at all stages of development. It, too, changes during the course of development. There is an increase in the dental height, beginning with the eruption of the deciduous teeth, and continuing to the completion of the permanent dentition; then begins a decrease, at first slight, then more marked, until senility brings on the loss of the teeth. The figures in the third column of the table will illustrate

¹The choice of this skull collection was made in full recognition of the fact that it does not represent mankind in detail. It does, however, represent a human type. The study of this group, therefore, furnished only a rough outline of the problem. The color and relief, so to speak, needed to make this into a complete picture, will be furnished in the future.

¹The dental height was obtained by measuring the distance between the lower borders of the upper alveolar process and the upper border of the lower alveolar process at the median line.

RELATIONSHIP BETWEEN HEIGHT OF FACE AND DENTAL HEIGHT

	Facial Height		Dental Height		Relative Dental Height
	Average in mm.	Increase in percent	Average in mm.	Increase in percent	Percentages of facial skeleton
INFANCY					
Before completion of deciduous dentition	60.43		6.1		9.23
EARLY CHILDHOOD					
At completion of deciduous dentition.....	69.20	14.20	8.20	25.12	10.59
LATE CHILDHOOD					
First permanent molars in place; some or all permanent incisors erupted....	75.50	9.1	11.20	26.78	12.92
PUBESCENCE					
Permanent dentition (less wisdom teeth) complete.	100.00	32.45	11.60	3.5	10.39
ADULT AGE					
Permanent dentition, including wisdom teeth, complete	106.20	6.2	11.00	— 5.17	9.38
OLD AGE					
Teeth show considerable wear.....	110.33	3.89	9.1	—17.27	8.46
SENILITY					
Permanent teeth are being lost and alveolar process atrophying.....	101.80	—7.73	5.7	—37.40	5.39

NOTE: The minus sign (—) means decrease. Facial height represents height of facial skeleton, without the teeth; dental height is the height of the dentition.

this. The figures in the fourth column show the percentile increase and decrease at the different stages.

Another outstanding feature brought out by these measurements is the relationship between the development of the dentition and the growth of the face. The importance of the part played by the dentition in the process of the vertical growth of the face will be apparent when a few figures are cited. Thus, before its completion, the deciduous dentition represents 9.23% of the total height of the face.

— With the completion of the deciduous

dentition, the percentage rises to 10.59. When, in addition to the deciduous series the first permanent molars have erupted and some or all of the permanent incisors have taken the place of their deciduous predecessors, the dental height is 13% of that of the face. After the remaining deciduous teeth (canines and molars) have been lost and are replaced by the succeeding permanent teeth (canines and premolars) and the second permanent molars are in place, the percentage decreases to 10.39. This decrease then continues during adult and middle age to 9.35%;

in old age to 8.46%, and, when senility brings about the loss of most of the teeth, to 5.3%.

The interesting facts brought out by these figures may be stated in a different way, namely, the height of the dentition bears approximately the same percentile relation to the height of the face during early infancy as during adult life, and during early childhood as during pubescence. But in late childhood, when the face shows the least increment, the dentition is developing at its highest rate and shows the highest relative proportions. This is just at the period when the face remains infantile, while the dentition assumes its adult character by changing the deciduous for the permanent series. The lowest relative proportion to that of the face then appears in senility. But, despite the fact that the face is actually decreasing in height during senility, the loss of the teeth actually shows a lower relative dental height than at any of the other stages, noted. One curious thing should be mentioned: when the dental height reaches its highest dimension, it shows a decrease in its relation to the facial height. This is explainable by the fact that just when the permanent dentition is completed, there is the greatest increment in the facial skeleton; i.e., the face undergoes those changes

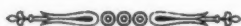
which transform it from that of the boy or girl to that of the man or woman.

There are, then, three fundamental facts to be recognized:

1. The growing face continues increasing in height from infancy to old age, and the greatest increase occurs at the time when the adult stage is reached. There is, however, also a decrease to be noticed. But that occurs in senility.

2. The dentition, too, follows a certain course during its development. The dental height increases from the time the deciduous teeth begin to erupt in early infancy to the completion of the permanent dentition, lacking, as yet, the wisdom teeth (third molars). But as soon as full growth is attained (the third molars completing the permanent dentition) a decrease in the dental height begins.

3. The relationship between phases 1 and 2 brings an interesting fact into relief, i.e., it shows that the stage presenting the greatest increase in the dental height, precedes that of greatest increment in the growth of the face. This is very interesting for it demonstrates that even the adult reminds one of some phylogenetic (group development) facts concerned with the mouth and face. The mouth, being the oldest part of the face, develops first; the face then grows around it.



The Hair

By C. H. DANFORTH

Department of Anatomy, Stanford University

MAN differs from all other mammals in the complete lack of tactile hairs, and from all other anthropoids in the total loss of hair from the terminal segments of the fingers and toes. The specialized "feelers," whose absence has been cited as one of the most distinctively human traits, may, according to both Broman and Schultz have a fleeting representation in the early foetus, but these transient rudiments never produce real hair. On the distal segments of the digits no trace of follicles has been found at any stage.

As compared with many, but not all, of the lower mammals, man also shows a marked reduction in the total amount of hair, and a deficiency of several types besides the true tactile forms. Hairs which could properly be classified as spines, awns, wool or fur, fail to appear in the human pellage, which consists essentially of only two forms: the down, or vellus, and terminal hair which belongs to the category of bristles or mane and corresponds to similar hair in the anthropoids.

The vellus, which is one of the most characteristic features of the human pilary system, covers almost the entire body and is composed of numerous, minute, unpigmented hairs with relatively large cuticular scales and no medulla. In contrast to the vellus are unevenly distributed hairs which have relatively smaller scales and well developed medullas. These latter are called terminal hairs, in the sense that they represent the ultimate grade of morphological differentiation of hair (in man). The outstanding differences

between these extremes are shown in Fig. 1. Between the two forms may be found transitions representing all intermediate phases.

The presence of transitional hairs suggests that we may have to do with only one fundamental type. Hausman has recently shown that the dimensions of the scales and the development of the medulla is primarily a function of the size of the hair rather than a regional or racial characteristic. To this it might be added that within any circumscribed area of the body the life span of a hair—the time between its first appearance and the appearance of its successor in the same follicle—is roughly proportional to its size. Thus in the course of 31 months a single

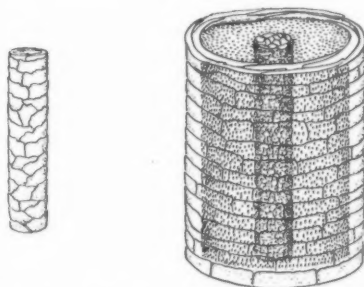


Fig. 1.—Slightly schematic sketch of a vellus, or down hair, and a terminal hair from the chest of a white man

follicle on the finger produced in succession nine hairs of moderate size, while during the same period another follicle less than a millimeter distant produced twelve small hairs. Although individual follicles usually produce practically identical hairs at each successive cycle, the output occasionally changes so that down may be replaced first by

transitional and later by terminal hair. Trotter found that the latter tend to become coarser as age increases.

Racial differences in the vellus and fine transitional hairs have not been

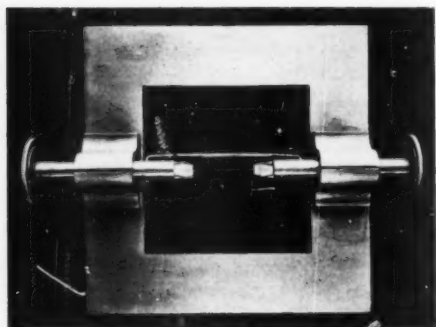


Fig. 2—A convenient form of hair rotator. The hair (white line in the photograph) whose index it is desired to ascertain, is secured in the axis of the crosspieces by means of the clips and the rotator placed on the stage of a microscope where the greatest and least diameters may be measured by means of an ocular micrometer or by projection. The amount of rotation may be read from scales on the milled heads. The distance of the two rotating crosspieces from each other may be adjusted by means of the excentric connecting piece, or may be made to act separately by its removal

adequately studied. On the middle segments of the fingers all hair is usually absent in the negroes, usually present in white races, and variable in yellow races. Trotter was unable to find any significant difference in the actual number of fine hairs on the faces of white and negro subjects.

In the development of terminal hair there are well known racial, as well as age, sex, and individual differences. Many of these differences appear very gradually and not promptly at puberty, as is often supposed. For example, terminal hair on the ears, and "wild" hairs in the eyebrows usually appear

relatively late and increase over a period of many years. While there is a certain degree of what might be called regional autonomy in the production of terminal hair, there is also a strong tendency for hair to follow a definite sequence in its appearance in different parts of the body. That is, if one subject has hair in region *a*, another subject with more hair will usually have it in regions *a* and *b*, not *b* and *c*.

This progressive tendency in the production of terminal hair may be illustrated by reference to a limited area, the face. Children, most women, and possibly a few men have nothing but vellus on the cheeks, upper lip, and chin. The boy of a heavily bearded race begins at about puberty to show a few terminal hairs at the corners of the upper lip. Then these grow longer and others appear over the rest of the lip. This is followed by a few coarse hairs at the side of the chin and in front of the ears. Gradually these hair-



Fig. 3.—A lock of hair from D, showing the appearance of strands in their usual relations

covered areas extend and ultimately become continuous. The "full beard" is not attained for a number of years, and at no time do all the follicles reach the stage of producing terminal hair. In passing through these successive degrees of beardedness the young man parallels, one by one, the final stages

reached by occasional women of his own race and by the adult men (e.g. Indian, Japanese, negro) of certain other races. This phenomenon, which is also manifested by hair in other parts of the body, is very suggestive of what the morphologist calls recapitulation but it is doubtful if any phylogenetic significance should be attached to it.

The hair of the head, capillus, is most readily available and generally utilized for anthropological studies. Since the time of Peter Browne and Pruner Bey, both of whom attempted to classify the races of man on the basis of their hair form, it has been popularly supposed that the Indian's hair is straight because it is circular in cross section, the white man's wavy because it is oval, and the negro's curly because it is flat. But the case is not quite so simple as this. Negro hair is indeed flattened, but so, too, is much Chinese and Japanese hair that is perfectly straight. Hair that is really oval in cross section is uncommon. The degree of flattening in a hair may be indicated by a "hair index" obtained by multiplying the shortest transverse diameter of the shaft by 100 and dividing by the greatest diameter. Hair indices usually range between 50 and 98, and are best obtained by means of some form of hair rotator such, for example, as that shown in Fig. 2. In general, curly hairs have low indices (cf. Fig. 7) but occasionally straight hairs are found with indices lower than those of other hairs which are curly.

Studies of the follicles which produce different types of hair as well as observations on the shafts themselves indicate that the primary curl is due to a slight inequality between the two sides of the more or less flattened shaft. Another significant factor in producing the characteristic appearance of

the capillus, as a whole, is the twist of the shaft on its own axis. Since in each hair of the head the lesser curva-

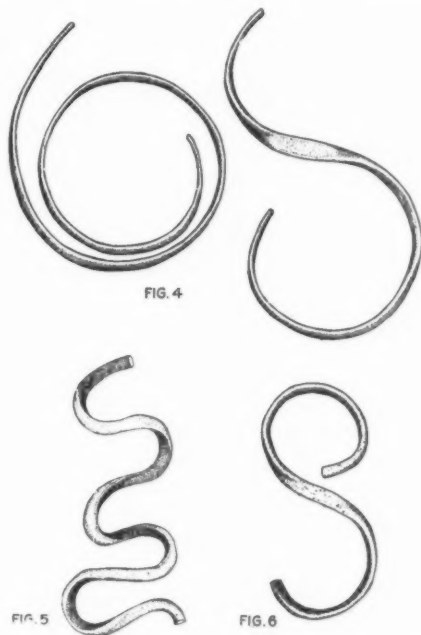


Fig. 4.—Two of D's hairs freed from the deformation effects of neighboring hairs. The one on the left is the more typical.

Fig. 5.—A hair from C. This is a characteristic negro hair which shows not only a coiling but a marked twisting of the shaft. The direction of the twist is reversed at the middle of the figure, changing the direction of the coil from clockwise to counter-clockwise.

Fig. 6.—Hair from a boy, E, with some negro blood, showing the negro type of twisting associating with a rather open coiling

ture remains consistently on the same side, a quarter or half turn of the shaft will change the direction of the curve and greatly modify the appearance of the hair. This important feature, which is usually ignored, is shown in one of the hairs in Fig. 4, and the two in Figs. 5 and 6.

In order to illustrate some of these points from sources close at hand the writer, having equipped himself with a kodak, a pair of scissors, and some

envelopes, spent a holiday in search of representative types. Interesting subjects were photographed and samples of hair secured from the side of the head

B is a boy of three, "old American," of English and Scotch descent. His hair shows a rather wide range of individual forms but gives the impression

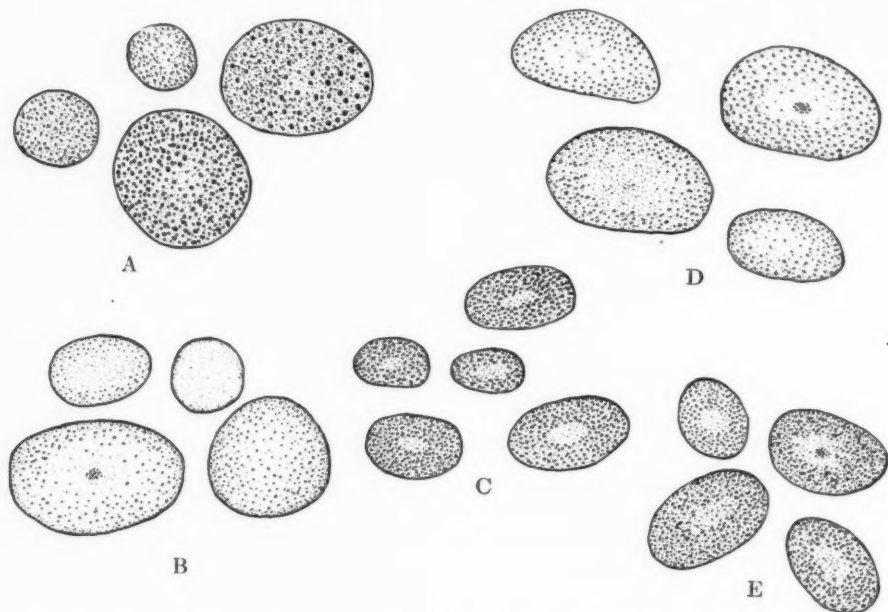


Fig. 7.—Cross sections of representative hairs of the five subjects A, B, C, D, and E

about half way between the vertex and the ear. The hair and photographs of five children were selected for the present purpose. After the pictures were printed, the backgrounds of trees and buildings were blocked out with India ink. The hairs selected were measured, sectioned, and sketched. Comparison of the sketches and photographs may help to show the relation between the form of individual hairs and the effects which they produce when growing in masses.

The first subject, A, is a boy of about twelve, born in Canton, China. His hairs are black, straight, of variable diameter and high index. Only a few are flattened, and these but slightly. (Samples from Chinese and Japanese subjects showing many hairs of rather low index were also procured).

of being perfectly straight. It may be noted that one hair is oval in section.

C is a negro girl of about five, apparently with no white blood, at least in her immediate ancestry. The hair is typical of her race. Its distinctive appearance is dependent upon two factors; the tendency to curl in rings of small diameter, and a persistent twisting of the shaft now one way, now the other, so that the direction of the spiral is in some places clockwise and in others counter-clockwise. It is the effect produced by masses of such hair that has led to its popular characterization as "wool." When cut rather short individual shafts tend to assume the form of an S with a twist in the middle.

D, a girl of ten, presumably largely German in ancestry, has hair which at



A



B



C

A.—A Chinese boy, with characteristic straight hair.

B.—A white girl, with straight hair.

C.—A young negro girl, showing the "woolly" hair characteristic of her race.

D.—A white girl, with exceptionally tightly curling hair which, however, differs very greatly from that of C.

E.—A boy, of mixed white and negro ancestry. His hair is negroid in some respects, but not in others



D



E

first sight might seem to resemble that of C or E. In the curled locks these hairs are in fact forced, by gravity and combing, into S-shaped curves as shown in Fig. 3, but individual hairs, isolated, dipped first in sodium hydroxide, then in water, and finally dried to restore their normal form, coil with a few exceptions in a single plane, like a watch spring. Negro hair when similarly treated behaves very differently. A few of D's hairs show an abrupt twist giving a true S-curve, but one with a wide diameter.

E, seven years old, would seem to be of mulatto and French ancestry. His hair is interesting in that it is of an intermediate type. The pigment is rather moderate in amount but distributed as in C. The twist in the shaft is such as is usual in negro hair, but the curvature is much less, giving an uncommonly wide loop.

From characteristics such as these, much information of anthropological value may be obtained, but the student of hair very readily becomes a skeptic

when he attempts to make observations on the heads of subjects he sees a-b-o-u-t him.

In the negro section of any large city one may see very black women whose hair has been coerced into a state of relative straightness, and in Chinatown many of the girls have hair that has been curled so tightly that lines of scalp show through as in the conventional pickaninny. Between such obviously artificial effects as these and the purely unintentional and relatively slight modification found in the hair of D, one meets a wide range of conditions and soon learns to record his "field observations" with caution.

The Relationship of Races as Shown by Blood Characteristics

By REUBEN OTTENBERG

IT has been known for years that the blood of many individuals does not mix perfectly with that of many others. In some cases the mixture of blood from two persons results in a kind of clotting of the red corpuscles; *agglutination* it is called by the scientists. It looks like the curdling of milk. It is on account of this that blood tests have to be carefully made before a blood transfusion, for if this agglutination were to occur in a person's veins it might have serious consequences.

This phenomenon does not occur at random but follows a remarkably regular rule discovered in 1901 by a Viennese scientist, Karl Landsteiner, now in the Rockefeller Institute in New York. Landsteiner found that there are four kinds of human blood, that the blood of all persons can be classified in one of these four groups, and that the blood of everyone belonging to the same group is compatible, while agglutination always occurs when mixing the blood of persons belonging to different groups.

Blood, as everyone knows, is composed of two chief ingredients, a watery part called serum and solid floating particles called the corpuscles. When the blood of one person agglutinates the corpuscles of another it is because the serum of the one person has in it a substance which has agglutinative action on something in the corpuscles of the other person. Landsteiner found that there were two such agglutinable substances in the

corpuscles. The one known as substance A is characteristic of the cells of persons belonging to Group II; the other, known as substance B is found in the corpuscles of persons belonging to Group III. Both A and B are found in the cells of persons belonging to Group IV (this is the rare group which comprises less than 5% of our population) while both A and B are entirely absent from the cells of persons belonging to Group I (which is the common group, comprising about 45% of our population).

In each case the serum of the person possesses the power of agglutinating that one of these two substances, A or B, which his cells do not contain. If this were not so we should all die, or rather, should never have been born. This is not as complicated as it sounds as will be revealed by the accompanying chart.

WHEN THE SERUM OF THIS GROUP MEETS THE RED CELLS OF THIS GROUP THERE IS

	I	II	III	IV
I	—	—	—	—
II	AGGLUTINATION	—	AGGLUTINATION	—
III	AGGLUTINATION	AGGLUTINATION	—	—
IV	AGGLUTINATION	AGGLUTINATION	AGGLUTINATION	—

OF AMERICAN POPULATION THIS GROUP FORMS ABOUT

45%	35%	15%	5%
-----	-----	-----	----

The agglutinative qualities of the blood, when once established in an individual, are permanent for life, and are as characteristic of him as the

color of his hair or the lines of his fingers. As research progressed it became clear that the blood groups are hereditary, and that their inheritance follows, with perfect regularity, the law of Mendel. The hereditary units or factors are A and B, so that a person who inherited A from one parent and B from the other would have in his blood both A and B and would thus belong to Group IV.

It would seem that hereditary characteristics such as these, permanent in the individual, and, moreover, easily tested, should have considerable anthropological significance. But it was not until 1918 that Ludwig Hirschfeld and his wife, Hanna Hirschfeld, working with the Swiss Red Cross in Serbia, had an opportunity which befalls few scientists. Serbia was, at that time, a melting pot of the world. Into it poured troops from all the European countries, from Africa, from Arabia, Turkey, Russia, and even from India. Hirschfeld examined and classified the blood of soldiers from all these countries, and combining his facts with some already published, was able to show that the proportions of persons of different blood groups are different for each race.

He found that, in a general way, the races from the North of Europe such as the English and the Germans, have a great excess of the Substance A (the Group II substance), while the races from Africa and Asia had far more of Substance B (the substance of Group III). The intermediate races around the Mediterranean basin he found contained about equal proportions of A and B. From this he made the deduction, which, however, is far from being accepted by all scientists, that the substance A must have originated as a mutation, which arose in prehistoric

times somewhere in Europe, and that the blood Group I showing the absence of both A and B is the original blood condition of the human race, while the substance B originated in Asia, also in prehistoric times. The present distribution of A and B, which is such that some of each is present in each race, would then be accounted for by the wandering and intermingling of races which is known to have taken place.

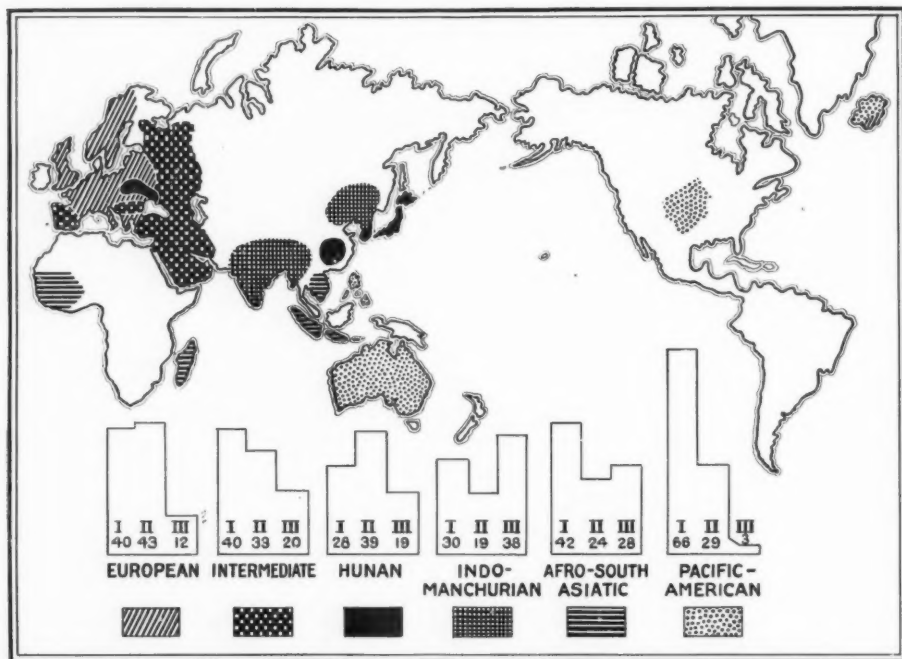
Since the work of the Hirschfelds, a great many additional races in other parts of the world have been studied and the facts have turned out to be a great deal more complicated than Hirschfeld at first supposed. All the subsequent work has confirmed the observation of a characteristic proportion of the four groups in each race. But the theory as to the site of origin of A and B does not seem to hold, as there are races in Africa, Asia, Australia, and America which show a high proportion of A to B just as do the North Europeans.

A map of the world showing our current knowledge of the geographical distribution of the groups is appended. Six fundamental types, based on the characteristic proportions of the different blood groups have been tentatively set up. The proportions of the three more common blood groups in each of these types are shown in the diagram below the map. Group IV has been disregarded because it forms so small a proportion in all of the groups excepting one, the Hunan type. Each of these types has characteristic proportions which distinguish it clearly from the others. Thus the European type is characterized by a relatively high proportion of Group II as compared with Group III. Two of the Asiatic types, the Indo-Manchurian and the

Afro-South Asiatic, which is found on the fringes of the Indian Ocean, are characterized by the reverse, more of III than of II. The Pacific-American type, composed chiefly of the Australian aborigines and the American Indians,

part of the population of the world has been studied. Nevertheless, the available facts point to a few striking suggestions.

Close examination of the figures brings out the existence of transition



Map showing distribution of populations having different types of blood-group combinations. Graphs giving average percentages of blood groups I, II, and III in each type

shows an enormous excess of Group I. The Hunan type shows less of Group I than any other types, and it shows an unusual proportion of Group IV. The Intermediate type for the most part inhabits the land lying between Europe and Asia. Its proportion of the groups is such as to really suggest an intermingling of the European and Asiatic types.

It is clear, as one studies the map, that we are not in a position to give a really full explanation of the relation of blood groups to races. The picture puzzle is too incomplete. Only a small

part of the population of the world has been studied. Nevertheless, the available facts point to a few striking suggestions. Close examination of the figures brings out the existence of transition

Extraordinarily interesting is the fact that the Jews in each country where they have been examined do not, apparently, form a uniform Jewish group at all, but closely resemble the population of the country which they have inhabited. Thus the German Jews in Berlin are almost identical

PERCENTAGE OF THE FOUR BLOOD GROUPS IN VARIOUS LANDS

Group (according to Jansky).....	I	II	III	IV	Racial Index	No. of persons tested
Red cell characteristics.....	0	A	B	AB	A/B	
I. EUROPEAN TYPE						
Swedish.....	36.9	46.9	09.7	6.4	3.3	533
Swedish.....	33.5	51.0	10.0	5.5	3.5	500
Norwegians.....	35.6	49.8	10.3	4.6	3.6	436
English.....	46.4	43.4	07.2	3.0	4.5	500
French.....	43.2	42.6	11.2	3.0	3.2	500
Italian.....	47.2	38.0	11.0	3.8	2.8	500
Danish.....	47.3	36.7	12.0	4.0	2.5	150
Germans (in Heidelberg).....	35.3	47.6	12.2	4.6	3.1	500
Germans (in Heidelberg).....	40.0	43.0	14.0	3.4	2.7	1000
Germans (in Hungary).....	40.8	43.5	12.6	3.1	2.9	476
Germans (in Kiel).....	39.8	42.8	14.0	3.4	2.7	500
Germans (in Leipzig).....	34.5	41.5	16.5	7.5	2.0	1000
German Jews (in Berlin).....	42.1	41.1	11.9	4.7	2.7	230
Austrians.....	42.0	40.0	10.0	8.0	2.6
Bulgarians.....	38.0	41.8	15.6	4.6	2.6	500
Serbians.....	38.2	41.6	16.2	4.0	2.5	500
Greeks.....	39.0	40.6	14.2	6.2	2.5	500
II. INTERMEDIATE TYPE						
Arabians.....	43.6	32.4	19.0	5.0	1.5	500
Turks.....	36.8	38.0	18.6	6.6	1.8	500
Russians.....	40.7	31.2	21.8	6.3	1.3	1000
Jews ¹ (Spanish).....	38.8	33.0	23.2	5.0	1.3	500
III. HUNAN TYPE						
Japanese.....	26.8	40.9	18.4	13.9	1.69	363
South Chinese (Province of Hunan).....	31.8	38.8	19.4	9.8	1.66	1296
Hungarians.....	31.0	38.0	18.8	12.2	1.6	1500
Roumanian Jews.....	26.1	38.8	19.8	15.3	1.6	211
IV. INDO-MANCHURIAN TYPE						
Ainu ²	19.0	32.7	34.5	13.7	0.93	205
Koreans ²	28.0	32.0	26.5	12.7	1.16	363
Manchus.....	26.6	20.6	38.2	8.5	0.75	199
North Chinese (Pekin).....	30.0	26.0	34.0	10.	0.82	1000
Gypsies (in Hungary).....	32.4	21.1	38.9	5.8	0.6	385
Hindus (Indians).....	31.3	19.0	41.2	8.5	0.56	1000
Poles ²	32.5	20.9	37.6	9.0	0.51	11488
Polish Jews ²	33.1	17.4	41.5	8.0	0.50	818
V. AFRICAN-SOUTH ASIATIC TYPE						
Negroes (Senegal).....	43.2	22.6	29.0	5.0	0.8	500
Americanized Negroes ²	49.0	26.9	18.5	5.5	1.4	270
Madagascans.....	43.5	26.2	23.7	4.5	1.09	400
Sumatrans.....	43.7	23.0	29.0	4.3	0.82	546
Sumatra Chinese.....	40.2	25.0	27.6	7.2	0.92	592
Javanese.....	39.9	25.7	29.0	5.4	0.9	1346
Annamese.....	42.0	22.4	28.4	7.2	0.8	500
South Africans ²	52.0	19.2	27.2	1.6	0.7	250
VI. PACIFIC-AMERICAN TYPE						
North American Indians.....	77.7	20.2	2.1		10.0	947
Australian Aborigines.....	57.0	38.5	3.0	1.5	8.8	204
Icelanders ²	55.6	32.1	9.6	2.6	3.4	800
Filipinos.....	64.7	14.7	19.6	1.0	0.76	204

¹Jews—"Refugees from Monastir—a people who came from Spain about 400 years ago."—Hirschfeld.

²These races do not exactly coincide with the type, but represent a transition to an adjacent type and have been omitted in calculating the average percentage.

with the general German population. The Spanish Jews tend to resemble the Arabs, the Roumanian Jews show a proportion of blood groups not unlike the Hungarians, and the Polish Jews show percentages strikingly like those of the other inhabitants of Poland.

In contrast to this is the fact that the Gypsies correspond to the Indo-Manchurian type in the proportion of its blood groups. This seems significant in view of the fact that the Gypsies are noted for never mixing with the population of the countries through which they wander and that they are traditionally supposed to have come from central India.

The striking resemblance of the figures of the Japanese, the Chinese in the southerly province of Hunan, and the Hungarians, is possibly accidental, since similarities of populations do not necessarily mean relationship; such similarities are bound to occur occasionally by accidental combinations.

Even more remarkable are the proportions of the Ainu—a wild primitive race living in the north of Japan and now rapidly becoming extinct. Because of their obvious physical

peculiarities they have been called a "race island." They have been tentatively placed in the Indo-Manchurian type but they really do not resemble any other race. They have less of Group I than any other people.

The fact that races which resemble each other are usually geographically adjacent is perhaps the fundamental fact of greatest importance.

The direction from which a clearer understanding is likely to come is indicated by the recent discovery, again by Landsteiner, that substances A and B are found in the higher apes such as orangs and chimpanzees. Landsteiner's data show that both A and B are found in different varieties of the anthropoid apes, A predominating in some varieties, B in others. This remarkably interesting fact, while adding further proof of the close relationship between man and the anthropoids, makes it seem probable that the blood groups go back to a period when humans and anthropoids were not yet separated. This discovery of Landsteiner, of course, does not provide an explanation of the characteristics of races but simply throws the explanation further back.

The Ordeal of Getting Civilized

TROUBLES OF AN INDIAN TREADING THE WHITE MAN'S PATH

By GILBERT L. WILSON

THE old Indian was wending his way upward to his cabin, but stopped halfway up the hill. He was too far away for us to see his features, as he stood gazing earnestly into the evening shadows where they fell on the rolling Missouri; then he turned again toward his cabin.

The young reservation schoolmaster laughed.

"Old Wolf-eye," he said, "I guess he is thinking of other days. He often comes out in the evening and stands gazing at the river. He finds it hard to live like a white man, but he is making a plucky try at it."

"Making any progress?" I asked.

"More than I would make if I were an old buck like him. He's been out in twelve war parties and lifted a half dozen scalps. He walks the white man's way now—has a small trading store beside his cabin; and with a few cattle and horses, and a potato field, and corn, he manages to get out a pretty fair living."

"Does he know English?"

"No, can't speak it anyway. He attended the reservation school for a time, after he was thirty years old, and learned to figure and spell easy words, so he can keep accounts in his trading store; but he has to have an interpreter if a white man comes in. Old Wolf-eye isn't a bad fellow, honest as pure gold."

"Good qualities," I said.

"They certainly are; and Wolf-eye isn't above learning yet, if he is old. Last winter he let his squaw go down to the woods every Monday and cut the week's wood. In the evening the old

buck went down with his pony and sledge and hauled the wood home. I told him that wasn't a white man's way; that our women didn't cut the wood; men did that. He was much surprised. 'Indian women always chopped wood in old times,' he said. 'I thought white women did.' The next week old Wolf-eye went to the woods with his ax, and in the evening his squaw brought down his horse and sledge. I guess Wolf-eye isn't as good an ax man as his squaw, for his load was smaller." And the schoolmaster chuckled.

I had wondered what would be the trials of an Indian getting adjusted to civilized life and it struck me that here I had a real find, a native of the old school, who could make clear to me the difficulties a barbarian must experience in treading the white man's path. I determined to seek out Wolf-eye.

The evening of the next day found me with my interpreter, Wolf-eye's nephew, in the old Indian's cabin. The sickly glow of a kerosene lamp half-lighted the room. Wolf-eye sat rather back in the shadows, but his face was toward the light and showed heavy but regular features, with full lips, wide cheek bones, and kindly eyes. He wore a calico shirt outside his overalls; on his feet were moccasins. He was smoking a long-stemmed pipe of red-stone. Evidently he was expecting us. A comb lay on the table and his hair, untinged by gray, was newly kempt. Indian-like, Wolf-eye let me begin the conversation.

"You Indians don't show your age," I began diplomatically. "I think you

are older than I, but your hair is black as a raven; mine is quite gray."

His answer rather startled me.

"I wish my hair was gray. Then I would be a white man."

"But why would you want to be a white man?"

"Because then I could learn more about this world. I can speak very little English; and there are not more than 500 people to whom I can speak in my own language. What can I learn of them? I know a big war has just ended in Europe. What caused that war? I want to *know* things." The interpreter's English was broken, but I have put his words into intelligible idiom.

"But Wolf-eye," I said, "at least you can live like a white man even if you are not white."

"That is not an easy path for an Indian to walk. Indian ways are not white man's ways, and one cannot refuse to keep to the customs of his tribe. In olden days, we Indians held our foods almost in common. When one family ate, all ate. When one family starved, all were starving. We could not do otherwise. There were few families in the tribe which had not more than once been saved from starvation by food stores of others, especially in winter.

"We do not live so close to starvation now, but we find it hard to forget our old customs. A young couple, just home from the white man's school, are eager to raise wheat and build a good house. In the fall, they gather in their crops and store up potatoes, beans, and dried meat for winter. Then their relatives come to visit them, and stay until all their food stores are gone. I do not think white people do that.

"It is the same if we try to raise stock. Our agent tells us that we

ought to raise hogs. My son bought a pig to raise. He built a pen for that pig, and fed it much corn; and he subscribed one dollar for an agricultural paper, to learn how to raise that pig. In the paper he read that he should let the pig out every afternoon for fresh air. So my son bought an alarm clock for two dollars, and set the alarm every day for four o'clock, so he would remember to let out his pig. The pig grew big and fat, and the bigger it grew the more corn it ate. That pig never seemed to get enough corn. In October my son butchered that pig. Then all the families of his relatives came to see that dead pig, and to every family my son gave a big piece of meat. In four days all the pig was eaten. My son says it does not pay to raise pigs."

"But this reservation has fine grazing lands," I said. "Why don't you keep milch cows?"

"We tried to keep milch cows," answered Wolf-eye, "for we liked the milk. But none of our older Indians can read or speak English. The Government has allotted us farms and tells the Indians they must live on their farms. But these farms are far apart. The 500 Indians of my small tribe are scattered for fifty miles along the Missouri River. They have no books to read, no magazines to amuse them. An Indian family becomes lonesome and goes to visit friends; maybe they cross the Missouri in a flat boat, and are gone two or three weeks. When they come home again they find their cows dry; or the cows are wild, and kick if the Indians try to milk them. Also the coyotes have stolen the Indian's chickens. One cannot keep a strong heart when things are like that."

"But your young men are educated in our schools. If they are ambitious,

they can join white communities and live like white men."

"That is hard to ask of them. A young man's heart yearns for his own people. In olden times, a young man was ambitious. He was eager to be a warrior, not that he liked to fight, but if he struck an enemy, every one praised him, the girls smiled at him, and he could marry any one he wanted. White men are ambitious to make money, so that others will think well of them, and they can marry into good families. But we Indians cannot get rich on this reservation, where all our relatives visit us and eat our food. There is now nothing to make us ambitious."

"But if your young men are educated and know English, why cannot they compete with whites, and get rich as white men do?"

"That is not easily done. Our reservation schools are not good, and an Indian lad is not equipped as a white boy is equipped. Then, even if a young Indian has a strong heart, there is not much he can do on this reservation and his relatives often try to keep him back in the Indian ways."

"Cannot many of your young men find employment with white people?"

"Some of them do, but white men often refuse to employ Indians. Even if trained to some trade, an Indian raised on our reservation cannot know the thousand-and-one little things that will make him at home in white society and which are such a help to one's work."

"But white men usually treat Indians kindly, do they not?" I asked. "Americans admire the Indians. Many books are written about Indians and their customs."

Wolf-eye answered with feeling, but he spoke calmly.

"For twenty years I have tried hard to learn white men's ways. In all that time I have met but three white men who treated me like a brother, Mr. Hall, the missionary, an agency clerk, and a man who came to us from the American Museum of Natural History. We Indians are proud. It hurts our hearts when white men tell us we are greasy and dirty. We do not like to have them say, 'You are just like dogs!' We Indians know very well how we now live, and that our old customs do not fit into the life our young people must learn to live. In old days, every young man went each morning for a bath in the Missouri; in winter he cut a hole in the ice, and after his bath, rubbed himself with white clay. We lived then in Like-a-fishhook Village, right on the river. Now our families are, many of them, two or three miles from the river, and we have no baths in our cabins."

"Our clothes are not neat and clean, like white men's clothes. In olden days, we dressed in skins, which we could clean with white clay. Now our clothes are of cloth, and we do not know how to care for them. Many of our women own washtubs, and know how to use soap; but it is hard for them to heat water in our cold winters. Our cabins are small; our women cannot take their tubs out of doors in the biting wind, when the ice is four feet thick on the Missouri; and if they wash the clothes in the cabin, the air gets full of steam while the water that splashes on the floor freezes. Then the door is opened to let out the steam and the room gets cold; so we build a hot fire in the stove, until we have to open the door again, to cool the cabin. Our children thus catch cold, and have lung sickness."

"But you have more to eat now than

you had when you lived by hunting, have you not?" I asked.

"Yes, but we do not know how to prepare many of our new foods. In old days, when a buffalo was killed, our women knew how to cook every part. But our women cannot make things like rice, potatoes, wheat, and oats, into good-tasting foods. And this I think very bad for sick people. An Indian woman's baby gets sick. The reservation doctor is maybe thirty miles away. That Indian woman gets scared. She does not know what to do. She remembers that when she feels tired, she drinks coffee, and it makes her feel good. So she makes a big pot of coffee, and gives it to that baby. Maybe that is why so many babies die on this reservation."

"Did they not die so in olden times?" I asked.

"Not so many died. In winter we lived in earthlodges, down in the timber, out of the cold prairie winds. The fire did not warm the lodge much, but we had warm robes and plenty of fresh air came down through the smoke-hole. We did not sicken and die then."

"But you have many things, now, that you did not have then. Do you not live more comfortably?"

"In many ways, yes. We have iron axes, and iron hoes and guns. In my grandfather's lifetime we had few horses; and when we made long marches over the prairie, our baggage was borne on the backs of women, or on travois dragged by dogs. Old people suffered very much on these marches; if they fell sick, we sometimes had to leave them to die on the prairie. Horses have made traveling easier for our tribe.

"Iron axes make the work of our women easier. When I was a boy, we still lived in earthlodges, which our

women built. My grandfather told me that it was hard to cut posts with stone axes, and split puncheons with horn wedges. Our iron hoes are better than our hoes of bone; and we can cultivate more corn now that we have plows.

"But I am not sure that gunpowder has been a blessing. For a time that made it easier to hunt game, but the buffalo herds were soon killed off. Then, in olden days, when we fought with arrows, not so many men were killed. After the Sioux got guns, they could come opposite our village, and shoot across the Missouri at our women as they went down to get water. The Sioux could not have done that with arrows."

"I am sure horses are useful to the Indians," I said, "and you have other live stock, also."

"Yes, we have cattle; some families raise pigs, and not a few have chickens. But we have other live things from white people that we do not like. We have rats and a new kind of mice. We did have lice in old times, but we never had flat bugs that now get into our beds.

"We knew what fleas were. When a hunter killed a kit fox and fetched it home, he always found himself covered with fleas that came out of the pelt. But he put a robe over him and smoked some sage under it, and all the fleas were killed or driven off. When we first got white men's fleas, we thought they were like kit fox fleas; but we soon found they were not. 'Kit fox fleas hardly bite us,' our old men said. 'But these new fleas are different. They have big teeth.' Some summers our cabins are just overrun with fleas. If a family is away for two or three weeks, they hardly dare enter their cabin. Sometimes a man rolls up his trousers and smears oil over his legs

before he will enter: the fleas die if they hop up on the oil that is on his legs."

"But I hear that the Indians are having better health now that they send more often for the reservation doctor when they are sick."

"That is true. I think he understands many white men's diseases better than our medicine men do. Then, too, he tells us that in the white man's road we are now trying to travel, there are many things that make us have diseases, that we did not know in our old life. He says we will get lung sickness if our cabins are not clean. My wife sweeps my cabin every day and I whitewash the outside and the inside twice a year. If my child takes sick, I send for the reservation doctor right away. But my father was a medicine man who said sickness comes from evil spirits. If the doctor does not come at once to my sick child, I sometimes sing one of my father's sacred medicine songs. I cannot always wait till the doctor comes. Once a man from a museum wanted to buy my father's medicines. I was afraid to sell them, because I knew the wonderful things those medicines had done. I worship the one, true God now, and I know it is wrong to worship my father's medicines, and I never do worship them. Still, I know the magic cures they have done, and I was afraid to sell them to the museum until one night I had a dream from my father's spirit that they would be put into a big

house built of stone, in New York, where they would rest forever and white people could see them. I thought, too, that it was perhaps best to sell them away from the reservation. I am a Christian now and if those medicines are in New York the spirits that may be in them will not get angry at me because I do not worship them. It is very hard for me to be a Christian because I cannot read the Bible much in English, and so I cannot know all of God's commandments. Then, too, I see Christians do things which the missionary tells me are wrong when I do them. I do not understand it!"

"Your children will understand better, perhaps. They are learning the Christian way in the mission schools."

"It is true; but they are learning many things that I cannot believe. The missionary teacher tells my son that the earth is round like a ball. That seems foolish to me. I have stood on the top of one of the Rocky Mountains, and the earth looked flat, just as it does here on the prairie. The teacher also says it is wicked to make war, and our Indian warriors did wrong in old days when they went out to fight other tribes. Why then do white men make war? In that big war in Europe, the Government took many young Indians from this reservation to be soldiers, to fight the Germans. Why don't white men leave off making war?"

And come to think about it, why do white men make war?



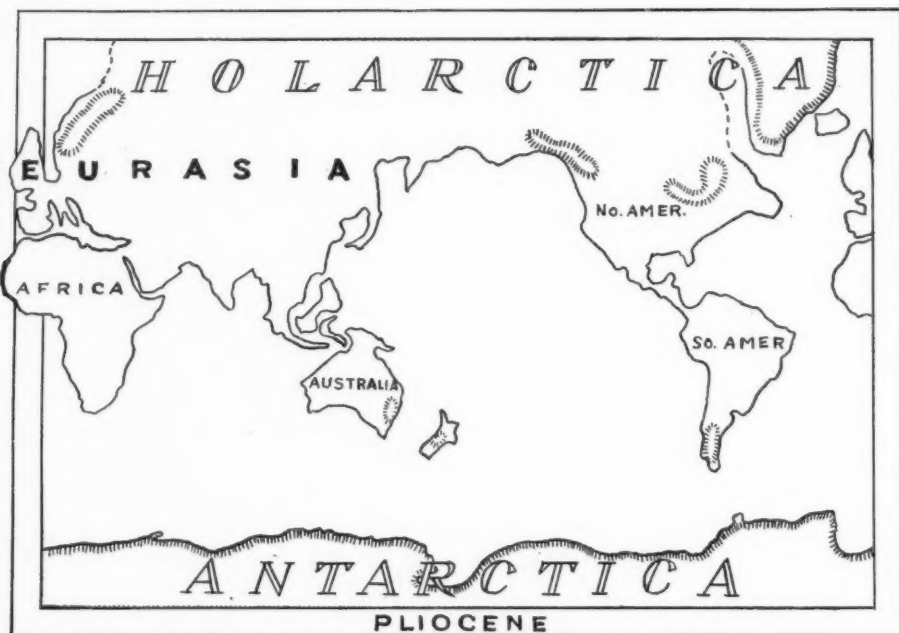


Fig. 1. Map of the hypothetical Eurasian-American continent during the Pliocene

The Ethnological Problems of Bering Sea

BY WALDEMAR JOCHELSON

THE ethnological problems of Bering Sea are not geographically limited to that region. They embrace areas much farther to the west, east, and south. It is the aim in this paper to review briefly the question of the Asiatic origins of the American aborigines, but as the title of this paper indicates, the author believes the original migrations from Asia to America took place in the region of Bering Sea. This does not take into account the wanderings on a smaller scale which have taken place in more recent times. Asia is now separated from the American continent by a strip of water sixty miles wide with several small inhabited islands situated in the middle. The Eskimo who live on both shores of the Seward and Chukchee peninsulas

at the present time frequently move from one continent to the other. In Asia, on the northern shores of the Arctic Sea, there is evidence in the names that villages now occupied by the Chukchee were formerly in the possession of Eskimo.

In discussing the original peopling of America from Asia, which is no longer a mere unsupported hypothesis but a theory founded on facts, it is necessary to take into consideration the aspects presented by the physical appearance of the peoples, the ethnological and linguistic relationships, and geological conditions.

First we need to consider in what geological period the peopling of America might have taken place. To answer the question, attention must be turned to the land connections existing

in prehistoric times before, during, and after the glaciations.

There is proof of a former land connection between the Seward and Chukchee peninsulas in the similarity of the rock structure on the two sides of Bering Strait.

The map (Fig. 1) as rearranged by Professor Henry Fairfield Osborn,¹

America in the middle of the Pleistocene, and the reindeer, elk, musk-ox, bison, mountain sheep, and black bear appeared in America toward the end of that period.

Now all of these mammals, including the mammoth, were hunted by man in Asia, as is shown by numerous archaeological proofs.² We may be sure man

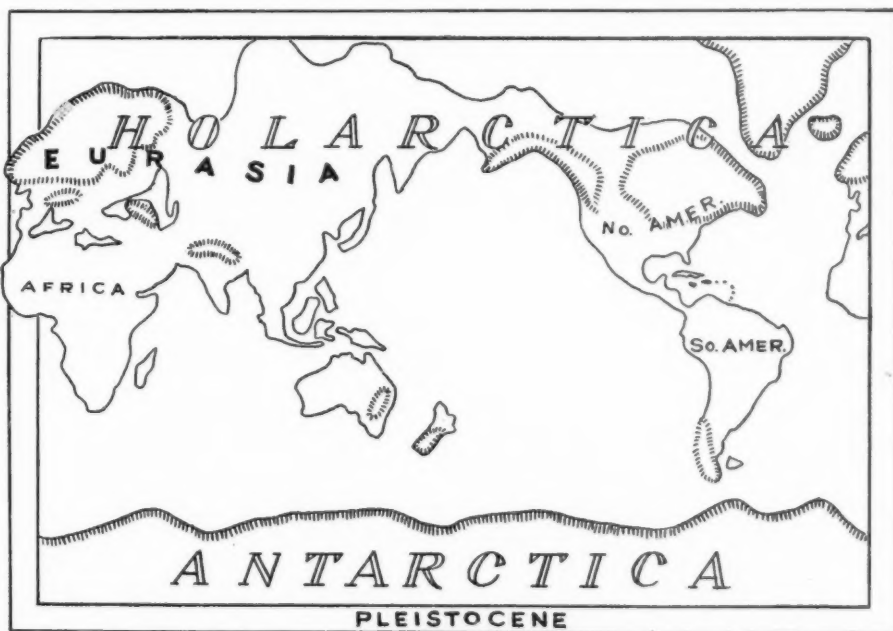


Fig. 2. Map showing the connection which it is assumed existed between Eurasia and North America in the Pleistocene

after Dr. W. D. Matthew, shows Holarctica as it may have been during middle and upper Pliocene. At that time North America and Eurasia are supposed to have formed one continent favoring a wide dispersal of mammals. The second map from the same source² shows a hypothetical land bridge between the Old and New worlds in the Pleistocene period, which bridge facilitated migrations at that time. The mammoth crossed to

followed his prey in their wanderings to America over the vast continental plateau which probably occupied what is now Bering Sea, Bering Strait, and a part of the Arctic Sea. The Holocene, or Recent Times, was a period of continental depression, and Asia and North America became completely separated, preventing further intermigration of land mammals.

¹Osborn, Henry Fairfield, *The Age of Mammals in Europe, Asia and North America*, New York, 1919, p. 303.
²Ibid, p. 373.

³See Dr. Vishnievski's chapter on "Fossil Man in Russia" appended to the Russian translation of Prof. Osborn's work *Men of the Old Stone Age*. Leningrad, 1924. Also Prof. B. E. Petri's *The Siberian Paleolith, Irkutsk, 1923*; *The Far Past of the Buryat Country, Irkutsk 1922*; *The Neolithic Colony in Pestchanaya Bay of the Baikal Sea, Irkutsk, 1921*. (All in Russian)

Soundings made by G. M. Dawson¹ in Bering Sea revealed a shallow marine plateau beginning just north of the Unimak Pass and running north-westward to the vicinity of Cape Navarin in Siberia. This he sees as the remains of a wide terrestrial plain which formerly connected North America with Asia and persisted during a long period of geological time. (See Map 3)²

Without attempting to determine the time, Professor Boas in a general way put forward the theory of a migration back and forth between Asia and North America, basing his conclusions on the results of the investigations carried on by the members of the Jesup North Pacific Expedition.³ The races situated on the two sides of the Pacific Ocean show a tendency to depart from the Mongol-Asiatic type.

He suggested that the race living in America was cut off from its congeners in the Old World and forced to migrate southward by the spread of the last ice cap. At the end of that glaciation, as the ice retreated in both North America and Asia, communication between the two continents again became possible, while Europe was cut off by the wide expanse of the Atlantic Ocean. Members of the American race moved back toward the north, crossed to Asiatic soil, and occupied the northeastern part of Siberia. I have called these Siberian tribes who have remigrated from America to Asia, Americanoids.⁴ We shall find a corroborative parallel in the history of the distribution of certain Asiatic zoölogical species.

¹Dawson, G. M. Geological Notes on some of the Coasts and Islands of Bering Sea and Vicinity (*Bull. Geol. Soc. Amer.* Vol. 5, 1894, p. 117).

²To the southwest of this line the sea-bottom reaches a depth of more than 3000 fathoms.

³Boas, Franz, Ethnological Problems in Canada (*The Journal of the Royal Anthropol. Institute of Great Britain and Ireland*, Vol. XL, 1910, p. 537); Idem. The History of the American Race (*Annals N. Y. Acad. Sci.*, Vol. XXI, pp. 177-183, 20 March, 1912).

⁴See Jochelson W. *Archaeological Investigations in the Aleutian Islands*. Published by the Carnegie Institution of Washington, 1925, p. 7.

The Russian zoölogists Severtzoff and Nassonov,⁵ after studying the distribution and structure of the wild sheep, have both come to the conclusion that this genus migrated from high Asia to America before the last glaciation; that in America they were driven south by the glaciation; that afterward the American stock spread again to the north, giving origin to another group, and finally that this new group spread back into the Asian continent and occupied eastern Siberia. The result is that the present Siberian sheep do not stand geographically and structurally in close relation with the sheep of high Asia.

Notwithstanding the differentiation of human types which occurred in America during and after the glaciation, by reason of isolation, the Indians present a fairly homogeneous aspect and exhibit a certain number of characteristics which they have in common with the Americanoid tribes of Siberia, and by which the latter differ from the Mongoloids of Asia.

First we may consider the skin color. Field anthropologists well know how difficult it is to determine the various shades by means of a scale. The existing tables of nuances do not help, but one can readily distinguish the fundamental racial pigment. The yellow of the Mongoloid, ranging from a light lemon-yellow tint to a dark or dirty yellow, is easily distinguished from the reddish-brown tints of the American Indians and the Americanoid Siberians, particularly the Koryak and Chukchee, the purest blooded of them. In many instances I had occasion to compare with these two the bluish-milky-white or rosy-white pigment of the skin of northern Europeans.

⁵See Sushkin P. P. Outlines of the History of the Fauna of the Palearctic Asia (*Science*, May 15, 1925).

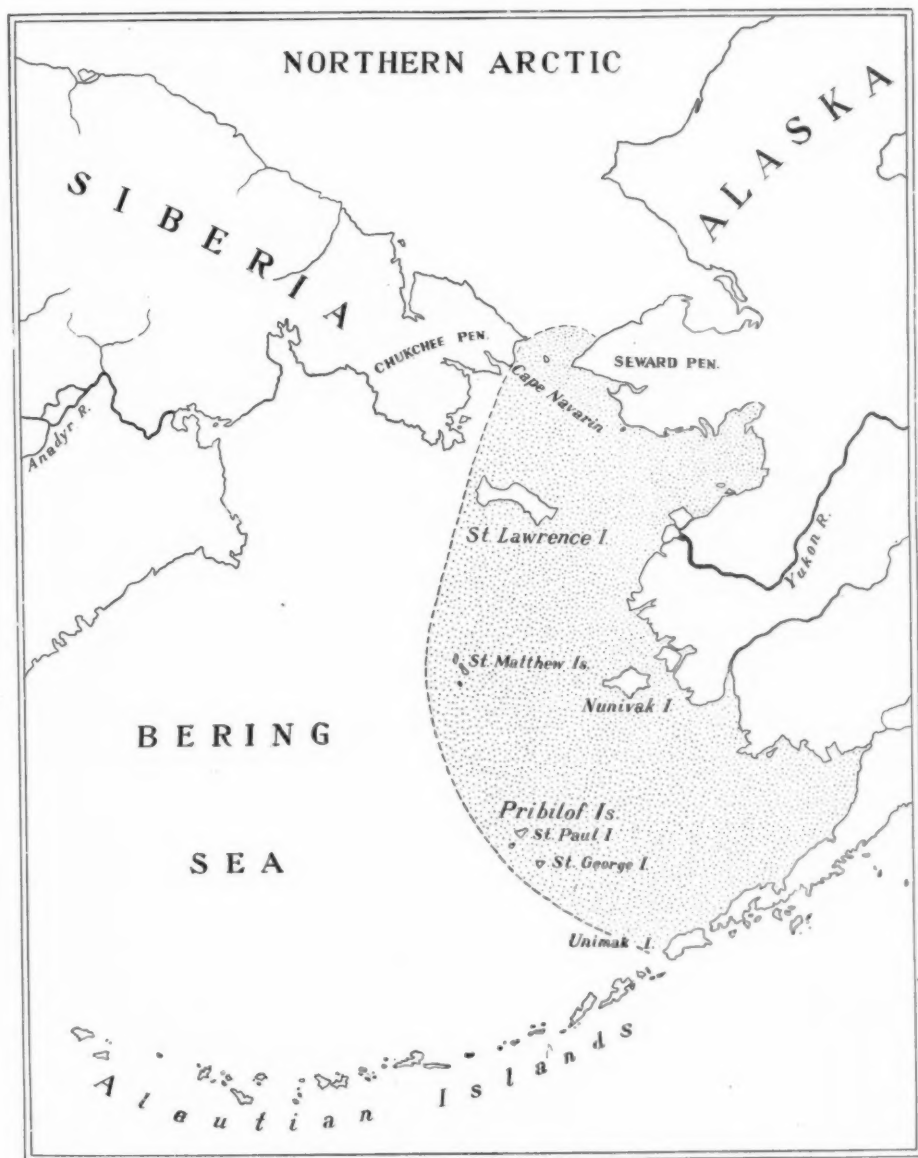


Fig. 3. Map of Recent Times showing no land connection between Asia and America

The head index of the Chukchee and Koryak is identical with that of the Indians of Northwestern America. The nose of these groups is not so broad and flat as that of the Mongoloids. The Mongoloid eye with its epicanthic fold is rare among them. The lips are moderately full and the cheek bones are

less prominent than in the Mongoloids.

There are also certain cultural traits common to America and Eastern Siberia. Some of the most prominent characteristics of certain American languages are also found among the Americanoids of Siberia. There is also much that is common in their folklore,

particularly tales about the mythical Raven, which indicates a common origin for their mythologies.

There are, however, certain things in the social structure and material culture of both groups which differ, and which must be explained in one way or another.

The looseness of the social structure of the Siberian Americanoids as compared with the class systems of the Northwestern Indians may be explained by the supposition that the social structure of the Northwestern Indians is a later growth.

The reindeer-breeding practised by some divisions of the Koryak and Chukchee, a specific Asiatic cultural achievement, was either acquired from the Siberian Tungus, or Samoyed Finnic tribes or was achieved by imitating their domestication of wild reindeer. The skin-boat and sea-hunting of the maritime Koryak and Chukchee is taken from the Eskimo culture. The Kamchadal, although geographically the farthest from the Northwestern Indians, are culturally the nearest to them. They have no reindeer, no skin-boats, and represent a genuine coast or river-fishing tribe. In one direction the material culture of the ancient Kamchadal differed from that of the Northwestern Indians. The latter had no pottery, while my excavations on the Kamchatka Peninsula brought to light a peculiar kind of pottery adopted from the ancient inhabitants of Japan, the Ainu.

I stated in the early part of this article my belief that the so-called Americanoid Siberians are Indians who returned to Asia after the ice cap in Siberia and North America subsided. We may assume that this occurred at the beginning of Recent Time. But at what time did the original peopling

of America from Asia take place? Certain writers, among them Holmes, Hrdlička, and Kroeber, are inclined to refer this to the end of the Pleistocene or even the beginning of Recent Time, that is, about 10,000 years ago. To this contention certain others are opposed.

Explicit objections have been raised by Dr. Pliny E. Goddard.

Linguistic evidence has been in existence for nearly a century, which makes the peopling of America in recent times improbable. Such diversity of languages as appears in America calls for many milleniums. Time has to be allowed for man to reach Patagonia where he appears to have been contemporary with an extinct ground sloth. Long after man reached America, maize was domesticated, together with many other native American plants, and only after that the great civilizations of Peru, Yucatan, and Mexico Valley grew up. In addition to these arguments for a longer period of time during which American culture may be supposed to have developed, we must consider a recent find which makes it certain that man was in America during Pleistocene times: Flints have been taken by skilled museum workers from under a completely fossilized skeleton of an extinct species of bison lying in an undisturbed Pleistocene formation in Texas.

These main arguments of Doctor Goddard's, which do not differ particularly from those put forward by Professor Boas many years ago, I have cited in order to show the differences of opinion concerning the time of the migrations. We may, of course, assume that there was more than one wave of migration. These important prehistoric considerations do not interfere with our theory of the ultimate

remigration of certain groups of American Indians to Siberia. However, the question is at the present time far from a final solution. We cannot say that we know all the nooks and corners of the problem. But more difficult still is the Eskimo problem.

The Eskimo, with the exception of some small groups on the Chukchee peninsula, live in Arctic America and, together with the Indians, they form the native population of America, which at some undetermined period migrated from Asia. The Eskimo at present separate the Indians from the Siberian Americanoids. The culture of the Eskimo forms a unit and the same is true of their speech. All Eskimo dialects form one language, including the Aleut and Kodiak dialects. Somatologically they show certain diversity in their cephalic indices. While the eastern divisions are dolicho-

cephals the western ones have a brachycephalic and even a hyperbrachycephalic head index. The facial bones of all divisions, however, show Mongolic dimensions. Even among the Aleut, who were much mixed with Russians, I met striking Mongoloid faces with a yellow skin color of a darker tint. Somatologically we must separate the Eskimo from the Indians and from Siberian Americanoids. But at what period the Eskimo migrated to America, whether earlier than the Indians or later, whether at one time or by waves—these questions must remain unanswered at least for the present. It seems to be certain, however, that occupying the northern part of North America after the last glaciation, some division of the Eskimo moved toward the southwest, thus separating the Siberian Americanoids from the North-western Indians kindred to them.





Doublers used in twisting two-or more ply yarns were made of Chonta palm, and had a carving in relief at either end. They are about 12" long



EXAMPLE OF PREHISTORIC PERUVIAN
WOOD CARVING

Wood Carving in Ancient Peru

By CHARLES W. MEAD
Honorary Curator of Peruvian Archaeology

THE old Peruvians, who excelled in ceramics, textiles, metallurgy, and architecture, did not, as a rule, carry wood carving to a very high state of development. This could hardly be expected of a people living where sandy deserts form so large a part of the coast region of Peru. Wood was scarce, and what little the inhabitants did have was brought from a considerable distance. The conditions in these deserts were most favorable for the preservation of wooden objects, yet few specimens of wood have been recovered in excavations.

The objects of wood comprise masks, handles of battle axes, ceremonial wands, and the doublers used in



The carvings represented a man or some animal, and formed shoulders which prevented the yarn from slipping off the stick

making yarn. The implements used in weaving, and spoons are the most commonly encountered. Such specimens show the same artistic feeling, if less technical skill, that is found in the textiles, pottery, and metal work of ancient Peru.

The best specimen of old Peruvian wood carving in the Museum's collection was excavated by A. F. Bandelier, at Pachacamac, in 1894. It is $4\frac{1}{2}$

inches high, and represents some high potentate, or perhaps a god, about to decapitate a man. In his right hand he holds a hafted stone ax. His left hand grasps the prostrate victim by the hair of his head. The victim's arms are tied behind his back. On the back is carved a man with headdress. He also holds a hafted ax in his right hand. The specimen is much defaced by the work of borers.

❧ ❧ ❧



Right side.—The object is hollow, and it is very possible that it was carried on a stick in some ceremonial. Some hollow metal objects were so carried



Left side.—The depressions representing the eyes and mouth were doubtless once filled with nacre, as were also the circular depressions



Rudolf Martin

1864 -1925

Recollections of Professor Martin as a Teacher

By DINA JOCHELSON

THE CLASSICAL and monumental work of Professor Martin, *Lehrbuch für Anthropologie* has furnished the very foundation for anthropological instruction particularly relating to anthropometric technique. I leave to others the preparation of memorial notes expressing appreciation of the deceased as the scholar ranking with Broca, Ranke, and other great

anthropologists. It is my wish to say a few words about Professor Martin as a teacher.

I was a candidate for a degree in medicine in the University of Zurich in 1900 when I was notified that I was to take part in the Siberian Division of the Jesup North Pacific Expedition. The leader of this Division was my husband, Waldemar Jochelson, and I was expected to take over the anthropometric

work in Siberia. In order to prepare myself for this field work I registered for the regular courses in anthropology given by Professor Martin, and also for the laboratory work in the anthropological institute of the University of Zurich, which had been created by Professor Martin. Subsequently, in 1903, my dissertation for the degree of M. D. was also an anthropological one and was prepared under the direction of Professor Martin.

Professor Martin's courses were required for students in the natural sciences but not for medical students. His lectures, however, attracted students from various faculties, historians, geologists, and others. It is well known that people ordinarily prefer to study foreign lands rather than their own country. So it is with anthropology, the science of man is often found less interesting than the knowledge of other zoological divisions. Professor Martin, however, had the secret of winning large audiences to hear about man. His lecture room was always filled to its utmost capacity, and he never inquired whether his hearers were entitled to admission or not. He was interested rather in the diffusion of knowledge than in fees. He was rewarded for his disinterested devotion to science by the interest with which his hearers followed his lectures. His friendly personality and graceful appearance were in themselves attractions, and his clear voice, and fluent, eloquent, High German speech animated the

dry bones of human anatomy even as a mountain brook flowing down bare Alpine rocks would add life and interest to a landscape. For example, no one could be more strongly scientific and at the same time more clear and popular in his presentation of the Darwinian theory and its bearing on the history of man's origin.

When Professor Martin learned that I was going to undertake field work, he gave me special instruction in addition to his regular lectures and the laboratory hours.

I shall always remember his yearly receptions at his villa near Zurich, where his anthropological students were invited to join his family circle. General unrestrained conversation was followed by scientific discussions. Professor Martin at that time was working on his handbook, and among his students were the now prominent anthropologists: J. Czekanowski of the University of Lwow, and D. Schlaginhaufen of the University of Zurich.

Professor Martin was as great a scholar and teacher as he was a man. The last two years of his life he experienced constant physical suffering; nevertheless, he continued his lectures, and in his last months, when he was confined to his bed by heart disease, he wrote reviews and edited his anthropological journal. He remained at his post until his last breath, and in him science lost one of its greatest soldiers.

A Biographical Sketch

By CHAS B. DAVENPORT

ANTHROPOLOGY has suffered a grievous loss in the death of Professor Rudolf Martin at München on the 11th of July last. There may have been greater anthropologists; but it was he who organized the *science* of physical anthropology.

Rudolf Martin was born July 1, 1864, at Zurich, the only son of a manufacturer. He studied at the universities of Freiburg i. Br. and Leipzig, receiving the degree of Ph.D. at the latter university, submitting a thesis on Kant. Probably under the stimulus of Wiedersheim and Weismann also he became interested in natural science and became docent in anthropology at Zürich in 1891.

Here he laid the foundations of his life work. In 1899 he became *ausserordentlich* professor and in 1905 full professor. He early undertook journeys to see for himself the centers of anthropological research on the one hand, and primitive peoples on the other. He traveled in France, England, and Spain. He journeyed to Patagonia and published on the physical anthropology of the natives (1893) and on ancient Patagonian skulls (1896). He journeyed to the Malay Archipelago, also, and there studied the Semang and Sakai (or Enoit) on which he published in 1905. These experiences in the field acquainted him with certain defects in the available anthropometric apparatus and led him to the invention of a

set of instruments for which he found a skillful manufacturer in P. Herrmann of Zurich. In 1911 he relinquished his chair in Zurich, partly for reasons of health and especially to devote himself to the publication of his *Lehrbuch*. At the outbreak of the war he had to leave Paris hurriedly, where he had done most of his literary work. Shortly thereafter he sent his book to the publisher, whence it appeared in 1914.

In 1917, after the death of Ranke, Martin was called to München as professor of anthropology. He united the anthropological institute and the anthropological, prehistoric collections of the city, and raised both to a preëminent position. He undertook an extensive investigation of the effects of war and its aftermath upon child development, measuring and photographing thousands of school children. Recently he became interested in the bodily form of athletes and the possibilities of physical development in students of secondary and higher grades of the educational system.

Rudolf Martin was a man of quiet mien with a capacity for ceaseless work. Literally to the day of his death, while kept from excruciating pain only by narcotics, he dictated letters, revised theses, wrote up his researches, and revised his book. With this industry was a love of order and detail. Thus, in 1907 he published a system of physical-anthropological bibliography (following a decennial classification), incited thereto by his friend, Dr. H. H. Field of the Concilium Bibliographicum. This industry and love of detail were combined with erudition and breadth of view; and this combination made possible his epoch-making *Lehrbuch der Anthropologie*, a treatise of 1200 pages, with 460 figures and including a bibliography of 100 pages and a very large number of tables. In this book the compilation of a single table often involved the review of scores of authors. Finally, in his last years

he founded the *Anthropologische Anzeiger* and personally collected titles and news for this quarterly.

Martin's organizing ability is shown not only by his book but also by his Institute, which became perhaps the greatest in the world, and by the city-wide scope of his anthropometrical investigations. Martin's ingenuity is revealed by the instruments that he invented, and his quality as a teacher by the number of his students, by their varied published researches, and by the loyalty which they yielded to him, as was especially shown on his sixtieth birthday. To help in instruction, he prepared, while at Zurich, a set of twenty-four wall charts in anthropology, ethnology, and geography.

The breadth of Martin's interest was very great and made him a delightful companion. That he was a student of Kant has been told; in describing his travels he considered zoölogical and geological questions, as well as anthropological. In his treatment of the Senoi he traces their history and relationships, and shows them to be one of the most primitive of peoples. He was a connoisseur and collector of art, a lover of music and of nature.

Martin's place in anthropology will probably be recognized in the future as this: the contributor of an account of the anthropology of two primitive peoples, and student of the development of children and of athletes; the organizer of instruction and perfecter of anthropometric instruments; and the founder of a new era by the publication of the greatest compendium of the science of physical anthropology that has ever been produced. Doubtless just this love of organization and completeness interfered with the conduct of numerous, original researches of a fundamental sort. In a way he sacrificed much of the fame that comes through a great contribution of original work in order to organize a science that stood badly in need of organization.





Alanson B. Skinner

1886-1925

ALANSON B. SKINNER, formerly assistant curator in the department of anthropology at the American Museum, was accidentally killed in North Dakota August 17, 1925. At the time of his death Mr. Skinner was connected with the Museum of the American Indian, Heye Foundation, and was engaged in ethnological studies among the surviving Dakota tribes. He was an energetic field worker, carrying on researches both in ethnology and archaeology, a very successful lecturer on the American Indian, and the author of numerous scientific papers.

Mr. Skinner was born in Buffalo September 7, 1886. His first scientific work was as a helper to Mr. M. R. Harrington, then engaged in local archaeological work for this Museum, when Professor Frederic Ward

Putnam was still the head curator in anthropology. Subsequently, Mr. Skinner, a boy in his teens, made a careful archaeological survey of Staten Island, his home, excavating many important sites. It was in fact the thorough exhaustive study of this definite island unit that laid the foundation for his mastery of eastern archaeology. He loved the out-of-doors and was especially successful in making contacts with the Indians. He believed, and rightly, that the study of archaeology necessitated also an understanding of the living Indians, and in consequence, he acquired the field technique of the ethnologist.

Because of his intimate knowledge of local problems, he was brought into the department in 1907, and immediately entered upon a productive career. His first important field trip for the Museum was to James Bay,

Canada, where he made collections among the Eastern Cree Indians. This was followed by a second trip to James Bay to study the Saulteaux Indians. Following this, in rapid succession, were studies of the Menomini, Ojibway, Oneida, Winnebago, Eastern Dakota, Bungi, and Plains-Cree. Perhaps the most serious undertaking was crossing the Everglades to collect among the Seminole in 1910. In addition to these major trips, there were brief archaeological excursions in Pennsylvania, New Jersey, and New York State, and

particular mention should be made of excavations on the Abbott Farm at Trenton, New Jersey.

Mr. Skinner resigned his position as assistant curator in 1916 and joined the staff of the Museum of the American Indian, Heye Foundation. He was at the Milwaukee Public Museum from 1920 until 1924, when he returned to the Museum of the American Indian.

Mr. Skinner was not only a genius in exploration, but an energetic investigator, as his list of published papers will show:

BIBLIOGRAPHY

THE INDIANS OF GREATER NEW YORK AND THE LOWER HUDSON.
NOTES ON THE EASTERN CREE AND NORTHERN SAULTEAUX.
POLITICAL ORGANIZATION, CULTS, AND CEREMONIES OF THE PLAINS-OJIBWAY AND PLAINS-CREE INDIANS.
SOCIETIES OF THE IOWA, KANSA, AND PONCA INDIANS.
SOCIAL LIFE, CEREMONIES AND FOLKLORE OF THE MENOMINI INDIANS.
THE SUN DANCE OF THE PLAINS-CREE.
THE SUN DANCE OF THE PLAINS-OJIBWAY.
NOTES ON THE SUN DANCE OF THE SISSETON DAKOTA.

All these were completed before Mr. Skinner left the Museum in 1915, since which date many other papers

were published, including the following:

EXPLORATION OF ABORIGINAL SITES AT THROGS NECK AND CLARONS POINT, NEW YORK CITY.
MATERIAL CULTURE OF THE MENOMINI.
MEDICINE CEREMONY OF THE MENOMINI, IOWA AND WAPETON.
NOTES ON IROQUOIS ARCHEOLOGY.
NOTES ON THE BRIDRI OF COSTA RICA.
THE PRE-IROQUOIAN ALGONKIAN INDIANS OF CENTRAL AND WESTERN NEW YORK.

A complete list will be found in *Indian Notes* Volume II, Number 4, October, 1925, published by the Museum of the American Indian, Heye Foundation. With his untimely death, these contributions came to an end, marking the premature close of a notable career.

NOTES

EXTINCT ANIMALS

FORTHCOMING MEMOIR ON THE MASTODON AND ELEPHANT FAMILY.—Professor Osborn's eighteen years of exploration and research on the Proboscidea, beginning with a visit in 1907 to the North African home of the Order, is culminating with the completion of his manuscript of a Memoir to be entitled *The Evolution of the Proboscidea* and to be published as a separate volume from the American Museum press during the coming year. This Memoir has been prepared with the aid of the J. Pierpont Morgan Fund and the Morris K. Jesup Fund.

The subject will be divided into twenty-four chapters beginning with Chapter I, "The Origin and Classification of the Proboscidea, Mastodonts and Elephants," and concluding with Chapter XXIV, "Bibliography of the Proboscidea." The manuscript covers 785 pages and includes altogether 269,000 words, which will rise to over 300,000 in the supplementary chapters and bibliography. There are upwards of 500 illustrations, mostly to be printed in the text. These illustrations include

facsimile reproductions of every type figure, so far as available, of the three hundred or more species described since Linnæus named *Elephas indicus* in 1754. The reproduction of these type figures, gathered often from very rare sources and represented by only one or two copies in all the American libraries combined, is an extremely important part of the work in its bearing upon the future study of the Proboscidea, especially in this country where so few libraries contain the older classics of paleontology. This monumental work has been greatly aided from the beginning by the coöperation of all the leading paleontologists of the world who have access to original proboscidean fossils and to the more or less imperfectly described collections in the museums of the world. Among these coworkers in this great undertaking who have expressed a very lively interest in the forthcoming Memoir is Dr. W. O. Dietrich of the Geological and Paleontological Institute of Berlin, who writes as follows (3 October, 1925):

Mit verbindlichsten Dank bestätige ich den Empfang Ihrer ausgezeichneten Synopsis fossiler Proboscider welche mein lebhaftestes Interesse erregt. In allen Punkten kann ich freilich nicht zustimmen.

Dr. Lucien Mayet of the University of Lyon also writes (9 November, 1925):

Cette question, si considérable, des Mastodontes est encore bien complexe et bien incertaine. Aussi attendons nous impatiemment qu'avec votre admirable génie synthétique vous lui donniez clarté et précision. Ce sera un nouveau et grand service que vous aurez rendu à la science paléontologique.

These encouraging letters of appreciation are enjoyed not only by the author but by the many able and willing assistants in the Museum who have rendered invaluable aid in the preparation of the manuscript and illustrations, especially Miss Mable R. Percy and Mrs. Lindsey M. Sterling. These letters will also encourage our printing department in the great task of getting this Memoir into bound form.

HISTORY OF THE EARTH

DR. C. A. REEDS represented the American Museum at the annual meeting of the American Association for the Advancement of Science at Kansas City, December 28-January 2, where he read a paper on "New York City as a Field for Earthquake Study."

DOCTOR MATTHEW recently lectured at Cleveland before the Natural History Society and three other audiences on "The Succession of Life through the Ages," an outline of the history of life on earth as shown by the fossil record.

LOWER INVERTEBRATES

DURING the month of July, Curator Miner, coöperating with Research Associate Frank J. Myers and assisted by Dr. G. H. Childs, artist, visited the Mount Desert Island biological laboratory to complete the field studies on rotifers and associated pond life in connection with the Rotifer Group, now in an advanced state of preparation. Many forms of minute pond life, including the associated water plants, were studied, and about one hundred water-color sketches were secured. Mr. Myers also advanced another stage on a new section of the monograph on North American Rotifers which he is completing in collaboration with Dr. H. K. Harring of the United States National Museum.

MAMMALS

MR. HARVEY S. LADEW left New York City on January 7 for an expedition to Bolivia and adjacent parts of South America. He took with him Mr. G. H. H. Tate, an assistant in the department of mammalogy, and has generously volunteered to pay all of Mr.

Tate's traveling expenses as well as the costs of equipping the expedition, in order that the Museum may secure collections of mammals and birds from the regions he visits. Mr. Ladew plans to be gone three or four months, and the exact details of his itinerary will be arranged after his arrival in Bolivia, when he can acquaint himself with local conditions. The immediate objective is a large plantation situated on the Amazonian slopes of the Andes, near Mt. Sarata, in Bolivia. Working out from this Hacienda, Mr. Ladew and Mr. Tate will coversome of the mountain plateaus, making such short trips as promise the best results. Eventually the party will leave Bolivia either by descending one of the tributaries of the Amazon or by working southward and coming out through Argentina and Paraguay.

This is Mr. Ladew's first visit to South America, but he is not a novice in exploration, having been on long trips in the Old World. It is fortunate for the Museum that Mr. Ladew's interest in science leads him to wish to do more than the average tour in South America, and his desire to have a Museum man accompany him will undoubtedly result in valuable additions to our collections.

COLLECTION FROM SOUTHERN AFRICA.—A recent letter from Mr. Lang, who remained in Africa at the close of the Vernay-Angola Expedition, reports that he has been very successful in his reconnaissance in Southern Africa. He states that he has shipped to the Museum considerable collections made at Luderitz Bay and elsewhere. He has found it necessary to request an additional two months' leave of absence in order to cover the itinerary he has planned.

THE AMERICAN SOCIETY OF MAMMALOGISTS will hold its Eighth Annual Meeting in the American Museum on the 28, 29, and 30 of April. Special exhibits will be arranged for the mammalogists in the halls and laboratories of the departments of mammals, vertebrate palaeontology, and comparative anatomy. Papers will be given in morning and afternoon sessions during the conference, and it is expected that many interesting topics will be presented.

BONE GROWTH IN THE ALBINO RAT.—In an interesting article dealing with bone growth in the albino rat by Frederick S. Hammett, under the title "Systemic and Sex Determi-

nants of Bone Growth (*Mus norvegicus albinus*)," Biological Bulletin, Vol. I, No. 1, Jan., 1926, pp. 61-71, it is shown that the growth of the femur follows that of the body more closely than does the growth of the humerus.

The period of weaning brings a marked reduction of growth capacity and the ripening of the sex glands brings another; thus the checking of the systemic growth factors brings about the observed weight and length differences in the adult males and females.—H. C. R

SCIENCE OF MAN

ARCHAEOLOGICAL WORK IN CAÑON DEL MUERTO was begun by Earl H. Morris in 1923. A very remarkable collection was secured, rich particularly in sandals and other textiles. This work was continued in 1924, but mainly for the University of Colorado which furnished the funds. Mr. Charles L. Bernheimer generously contributed a share of the support on behalf of the American Museum. The work held so much promise for the future that Mr. Ogden Mills has provided ample funds to continue it for three years.

Dr. A. V. Kidder, of the Peabody Museum of Harvard, but also connected with Phillips Academy of Andover, Massachusetts, was loaned by the latter institution to participate in this work. He, Mr. and Mrs. Morris, and several other workers, some of them volunteers, spent the latter part of September, October, and the early part of November, 1925, in active excavation. Again very important specimens and information were obtained. Of particular interest is the material from the period which lies between the Basket Makers who had no pottery and the Pueblo cliff-dwelling peoples who later occupied the same sites. The life of the prehistoric dwellers in the Southwest is now known with greater detail than that of any other such people. Pottery and architecture develop under our eyes, but objects used in religion and ceremonies have persisted from the earliest times. A medicine man's outfit from the earliest burials would still serve a modern Southwestern priest.

One of the most interesting finds last fall work was an eagle buried under a basket with mice and other small animals placed with him as food after his death.

MRS. WILLIAM BOYCE THOMPSON EXPEDITION.—The archaeological work in Arizona supported by Mrs. William Boyce Thompson

was resumed by Mr. Erich Schmidt in October. Additional rooms in the ruin known as Toge-tso were cleared and the adjoining cemetery thoroughly explored. Mr. Schmidt examined a ruin on Roosevelt Lake and later, at the request of the city authorities, did some preliminary digging at a large ruin, Pueblo Grande, near the city of Phoenix.

DR. MARGARET MEAD, now in Samoa studying as a Fellow of the National Research Council, has been appointed assistant curator in ethnology. Doctor Mead is recognized as one of the most brilliant of the recent graduates of Barnard College, receiving her doctor's degree from the department of anthropology two years after her graduation. She will look after the collection from the Pacific Islands and continue her research.

DR. J. ALDEN MASON, who has been assistant curator of Mexican archaeology since January, 1924, resigned at the end of 1925 to accept a position at the University Museum of Philadelphia. Doctor Mason came to the American Museum from the Field Museum of Natural History where he had held a similar position for some years. During Doctor Mason's connection with the Field Museum and previously, he had much field experience which took him to the Mackenzie River in Canada, into Mexico on several occasions, and to Colombia in South America. His general ability and his wide knowledge of specimens and people make his leaving the American Museum a loss to be regretted.

At the end of the present academic year Harry L. Shapiro will join the staff of the department of anthropology as assistant curator of physical anthropology. Mr. Shapiro has been trained at Harvard University where he is now serving as a tutor. He has had field experience at Pitcairn Island, where he studied the race mixture resulting from European mutineers and native women. The results of this trip will constitute Mr. Shapiro's dissertation for the degree of Doctor of Philosophy which he expects to receive in June. The collection of Professor von Luschan acquired through the generosity of Mr. Felix Warburg provides Mr. Shapiro an unusual opportunity for research.

MENTAL CAPACITY OF AUSTRALIAN ABORIGINES.—In a recent number of NATURAL HISTORY, a couple of instances are given of Australian aborigines who in mental capacity are apparently not inferior to the average white man. In 1892 I lived for nearly nine

months in North Queensland, and was in daily intercourse with the natives. I had been led to believe that the Australian-native was the lowest living human type, and I expected to find him not only in a low state of civilization but mentally on quite a lower plane than the European. I soon found, however, that this was by no means correct. Naturally one who has from infancy lived in the open bush or in the rudest of bark huts, and who knows absolutely nothing of civilization as we know it, will have a different outlook on the world from ourselves. Of course the natives had, and I suppose still have, different ideas from ours on many questions of right and wrong, but I soon came to the conclusion that they were intellectually not inferior to the average white, and that even morally if they stood on a slightly different plane it was not a lower plane.

It is said that the native cannot count and that he has no words in his language for any number higher than three—that he can count only one, two, three, plenty. Yet if sent with a flock of 2000 sheep to a station 100 miles away he knows if any have been lost and how many. Frequently natives journey with transport teams, and put up for the night at wayside inns. It was found that the native servants could soon take a hand at euchre and play just as well as their white masters. They certainly know the nine from the ten, and the right bower from the left.

When in North Queensland, I was reported to be the best checker player in the district. One day a full-blooded native was brought to me to have a few games. It was said that he had beaten all the whites with whom he had played. Though I managed to hold my own, I remember he got two draws off me, and that he played a remarkably fine game. Considering that he had probably never seen a white man till five or ten years previously, it must be admitted that at least some natives are not much if at all inferior in mental ability to the whites. Perhaps the superior types of natives are even more intellectual than the average whites.

As naturalists they are marvelous. They have a remarkable knowledge of the various trees, shrubs, birds, beasts, lizards, and insects. In this they resemble the South African Bushman. It is said that some years ago a new star was first noticed by a Bushman herd. Such an observation one might also expect from a native Australian.—ROBERT BROOM.

ERRATUM

IN the article in this issue of *NATURAL HISTORY* entitled "The Ethnological Problems of Bering Sea," an error has been made in Map 3 on page 93. Cape Navarin should have been indicated on the point to the south of the Gulf of Anadir.

REPTILES AND AMPHIBIANS

DR. G. KINGSLEY NOBLE, curator of the department of herpetology, has recently returned from abroad, where he visited the museums of Germany, Austria, Switzerland, France, Belgium, Holland, and England. The three main objects of the trip were successfully accomplished.

First, he negotiated exchanges of reptiles and amphibians with the various museums visited. Five hundred and sixty-five specimens were acquired and arrangements were made for securing about two hundred more. Nearly three hundred species in this series are new to our collections; forty-three genera and one subfamily were not previously represented in our Museum. As a result of these exchanges more genera and species have been added to our collections than in any previous year. Incidentally, up to this time, many of the forms were not in any museum in America.

Secondly, Doctor Noble made a record of the exhibits of reptiles and amphibians in the foreign museums. These data will serve as a useful basis when the final exhibition plans for the New Hall of Reptile and Amphibian Life in the American Museum are considered.

Thirdly, a study was made of all the amphibian collections, both recent and fossil, in the museums visited. These studies will serve to complete Doctor Noble's research work of the last five years on the phylogeny of the Amphibia.

MR. CLIFFORD H. POPE, zoölogist of the Third Asiatic Expedition, writes from Foo-chow, Fukien Province, China, November 16, 1925, that he is sending a very large shipment of reptiles and amphibians, as well as other vertebrates, to the Museum. He continues, "We had a very successful season so far as general collecting is concerned. I succeeded in obtaining several series showing the early stages of development of various Amphibia. Eggs were very hard to find after June, and the continuous rains through April and May made work difficult. As it was, my feet were put in very bad shape by the wading and I

had to spend a whole month sitting down or working only indoors.

"The collection on the whole is richer in species than the Hainan lot. Of snakes there are about fifty against twenty-seven species in the Hainan collection. I found what I take to be the eggs of *Pachytriton*.

"My plans for the spring are uncertain. I think that I can still secure some good material here in Fukien and may stay until late fall."

Mr. Pope's shipments have not yet reached the Museum, but two volumes of colored drawings by his Chinese artist, Mr. Wang, show that the collections are rich in rare forms.

LOUIS R. SULLIVAN

THE GALTON SOCIETY at a recent meeting passed the following Resolution:

WHEREAS, The late Doctor Louis R. Sullivan was one of the most active members of the Galton Society, of which he was elected a Fellow in 1918, soon after the foundation of the Society;

WHEREAS, He presented at its meetings the chief results of his important investigations upon the racial history of the Polynesians, the racial composition of the present mixed population of the Hawaiian Islands, the relationship of the Punin Ecuador skull, and other topics of exceptional anthropological interest;

WHEREAS, At the time of his death Doctor Sullivan's most ably conducted and comprehensive studies were leading him to still more important conclusions concerning the classification and evolutionary history of the races of mankind;

WHEREAS, The American Museum of Natural History has undertaken so far as possible not only to complete and publish the investigations upon which he labored almost to the day of his death, but also to carry on further researches along the lines planned by him;

WHEREAS, His good humor, his breadth and sympathy, as well as his keen and sensitive intelligence and other attractive personal qualities had inspired the devotion of his many colleagues and friends;

Therefore be it resolved: That the members of the Galton Society hereby record their appreciation of the fruitful life and works of their late friend and colleague and their gratification that the investigations conducted

by him are to be carried on along the lines he had planned;

And be it further resolved: That a copy of this resolution be forwarded to the widow and family of our late friend and colleague in token of our deep sympathy for their loss.

(Signed) CHARLES B. DAVENPORT,
Chairman
WILLIAM K. GREGORY,
Secretary.

NEW MEMBERS

SINCE the last issue of NATURAL HISTORY, the following persons have been elected members of the American Museum, making the total membership 8519.

Benefactor: MR. GEO. EASTMAN.

Associate Founder: MR. D. E. POMEROY.

Patrons: MESDAMES D. C. COOK, ANNIE TRUMBULL SLOSSON, AND MR. JOHN F. FOWLER.

Honorary Fellow: MR. LINCOLN ELLSWORTH.

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INSECT NUMBER

MARCH-APRIL

It is fitting that, following the present number of *Natural History*, which tells of Man, the issue for March-April should be devoted to the chief competitors of Man, namely, the Insects, "our rivals in these latter hours, and perhaps our successors." No class of animals has a more intimate bearing upon human welfare and possibly regarding no other is knowledge so essential. Some of the ways in which the public is being informed about insects are discussed by Dr. F. E. Lutz, curator of entomology, American Museum, in the opening article of the issue, which is illustrated by a representative series of insect pictures taken by the author.

The harmful phases of insect life are presented pithily by Dr. L. O. Howard, chief of the Bureau of Entomology and generalissimo of the force of economic entomologists to whose defensive warfare it is due that insect enemies have not made larger inroads upon the plants that furnish us with food and raiment.

Some insects devour our crops, others endanger health. The work of medical entomology is illustrated in an account which Dr. Joseph Bequaert gives of his recent trip into the mosquito-infested Amazon country as a member of the Hamilton Rice Expedition.

Without wishing to minimize the danger from certain insects, it is in order to recall the benefits, far outweighing these injuries, which we derive from other insects. It is not true that the only good insect is a dead insect any more than, for that matter, this statement, with substitutions, was ever true of the Indian. Some of the ways in which insects render indispensable services to man are told by Dr. F. E. Lutz in his article, "Friendly Insects."

Prof. T. D. A. Cockerell of the University of Colorado has traveled widely and, in making new observations, is able to draw upon the rich stores of his knowledge for comparison and contrast. In his article, "The Insect-hunter Abroad," he comments entertainingly and informingly upon the matters of entomological interest that came to his attention in his journeys to various island groups of the Old World.

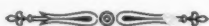
Dr. Vernon Kellogg, permanent secretary of the National Research Council, enjoys, and with full justice, a reputation not only as one of the foremost entomologists but as one of the most delightful writers upon insects, and he well sustains this reputation in a contribution entitled "The Color Dust of the Butterfly."

A foundation for the knowledge of insects cannot be laid too early and it is with particular pleasure therefore that announcement is made of an article for children by Miss Edith M. Patch, state entomologist of Maine, who tells the fascinating life story of one of our common moths.

We are apt to think of insects as creatures of the air and earth, but our ponds and running streams also harbor insect populations. Some of the little-observed phases of insect life in the waters are revealed through an article and attractive photographs by Mr. William M. Savin, who is well known to readers of *NATURAL HISTORY* through his previous contributions.

Every group of insects has its points of interest but there are few that so well repay the observer of their habits as the bees. Of the honey-bee everyone knows something, but the wild bees are still relative strangers to many of us. Some of their fascinating, yet perplexing, habits are touched upon in an article by Mr. Herbert F. Schwarz, research associate in Hymenoptera, American Museum.

If space permits, other articles will be added, but at best a single issue of the magazine can touch on only a few of the interesting phases of a class of animals that in number of species and in number of individuals within those species far exceeds all the other living forms on this globe.



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